THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVII. No. 1448.] LONDON, FEBRUARY 10, 1891. [43RD YEAR. Price 6d.

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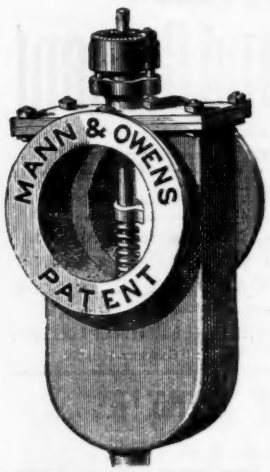

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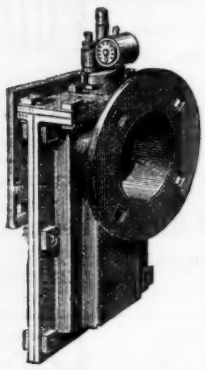

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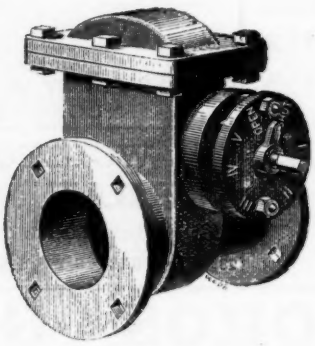

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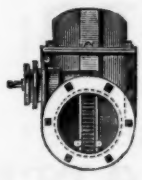

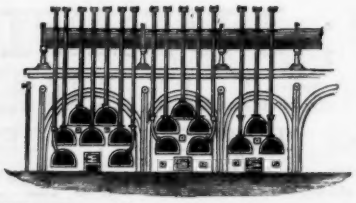

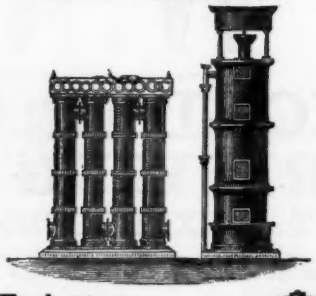

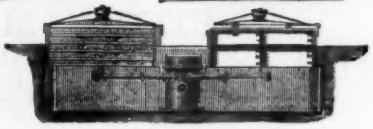

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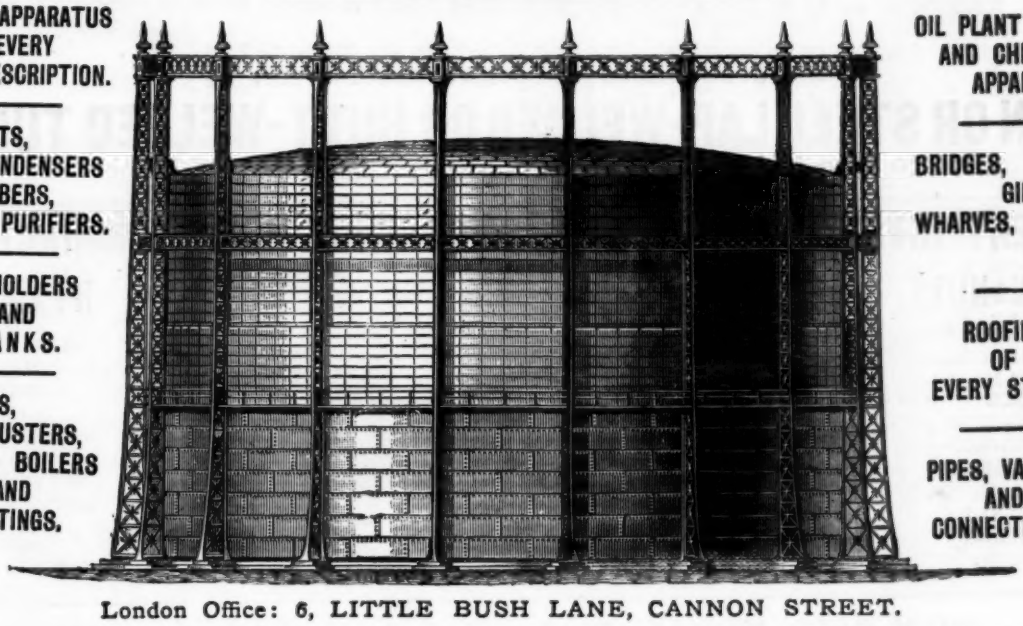

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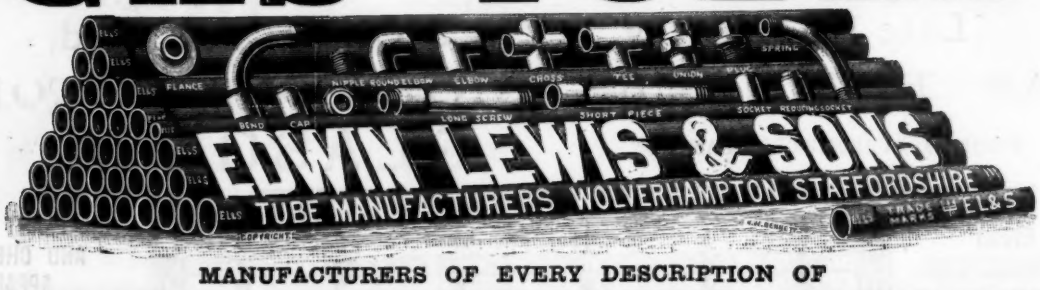

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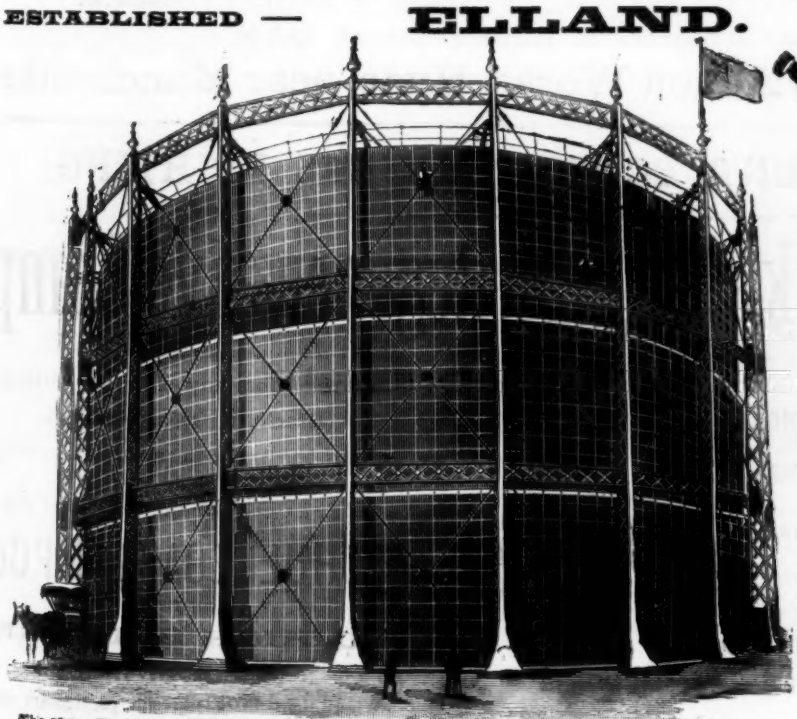

The above illustrates a TREBLE-LIFT GASHOLDER, 194, 191, and 188 feet diameter by 85 feet deep each, asmade for the MELBOURNE GAS COMPANY.

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Lamps giving 20-Candle power consume less than four feet of Gas per hour.

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Manchester	2,500,000
Glasgow	2,500,000
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Leicester	2,250,000
Melbourne	1,500,000
Charlottenburg	1,500,000
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Valparaiso	600,000
Halle	600,000
Barry and Cadoxton	500,000
Workington	500,000
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Erfurt	400,000
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Nine Elms (in part)	3,000,000
Shoreditch ,,	2,500,000
Pimlico ,,	2,000,000
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SOUTH METROPOLITAN GAS COMPANY—	
Vauxhall (in part)	3,000,000
Birmingham ,,	5,000,000
Croydon	1,500 000
Edinburgh	1,500,000
West Ham	1,500,000
Nottingham	1,500,000
Melbourne	1,500,000
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Maidstone	1,000,000
Kingston-on-Hull	400,000
Harrow	250,000
Buxton	250,000

For Testimonial from the Chief Engineer of The Gaslight and Coke Company, see last and next week's issue of the "Journal."

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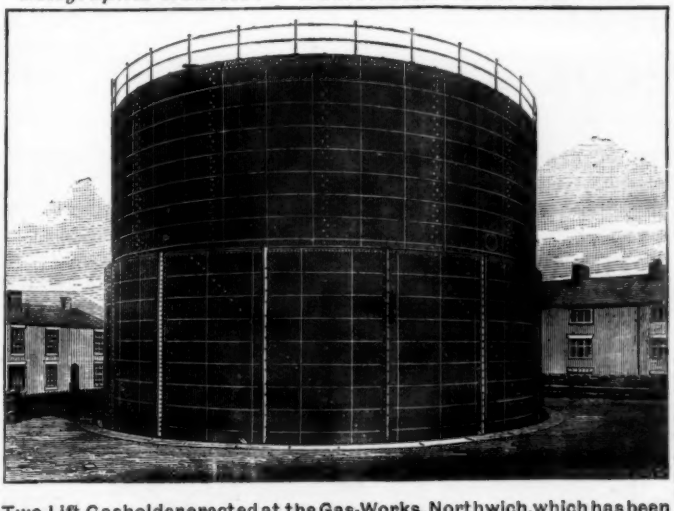

Two-Lift Gasholder erected at the Gas-Works, Northwich, which has been in continuous work since Jan. 3, 1890, and has been subjected to most severe tests from heavy gales, with perfectly satisfactory results.

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For Illustrated Description, see Advt. p. 223.

THE PROCESS IS FULLY PATENTED, AND ANY INFRINGER WILL BE STRICTLY PROCEEDED AGAINST.

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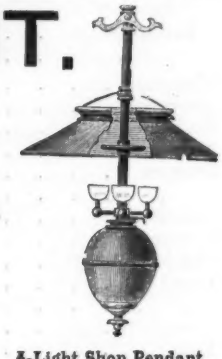

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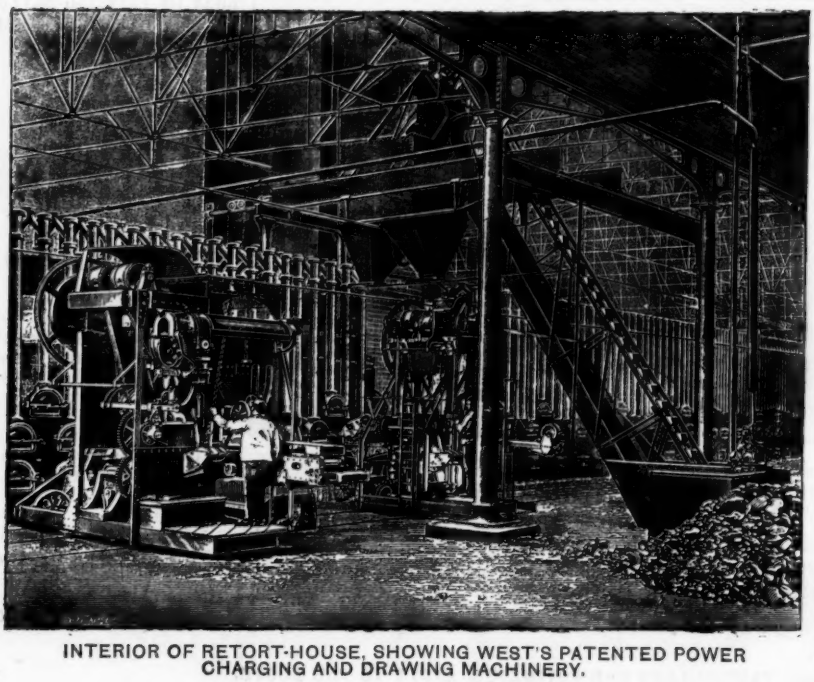

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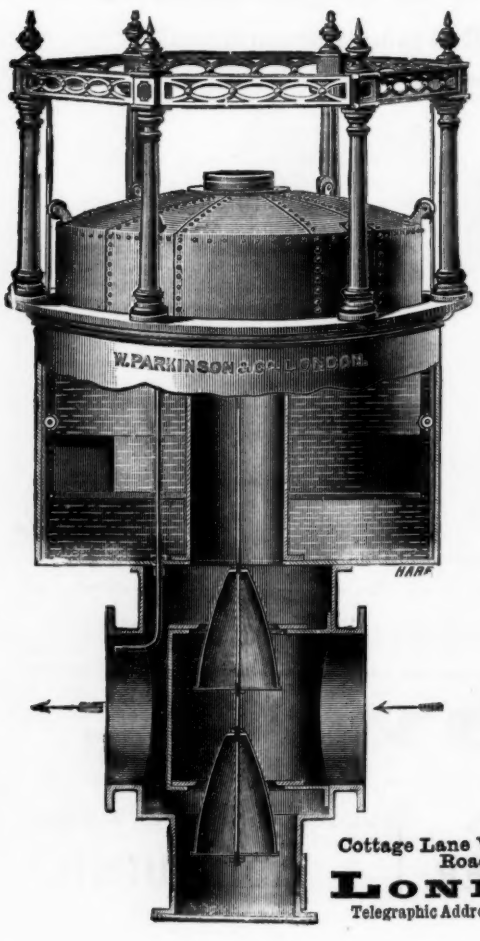

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Telegraphic Address: "Precision."
[See also Adv. p. 280.

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No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 10, 1891.

The Prospects of The Gaslight and Coke Company.

THE general meeting of The Gaslight and Coke Company last Friday was, as we had anticipated, full of interest. The attendance was unusually large; and although the proceedings were neither so agitated nor so lengthy as big shareholders' meetings generally presage, the Directors are not likely to misunderstand the temper that inspired so many proprietors to make the unfamiliar journey to the Horseferry Road. Many regular visitors, of course, were present; but they were quite swallowed up in the concourse of strange faces, which, it must be said, were anything but "wreathed in smiles" while the Governor (Colonel Makins, M.P.) rather nervously went through the principal figures of the accounts. Something very like a Directors' "*claque*" was there also, prepared to applaud to the echo everything done by the Board; but this element is never lacking at these meetings. The feeling in the hall naturally affected the occupants of the daïs; and although nothing seemed to interfere with the stolidity of the Deputy-Governor (Mr. H. C. Ward), who prompted his chief throughout with his customary readiness, Colonel Makins himself was evidently ill at ease. He is not accustomed to the apologetic vein. Jaunty cynicism is his *forte*, supplemented with a knack for turning off awkward remarks from a hostile critic. He had no mind for joking on Friday, however. Not a quip or a sneer of the mildest character enlivened his opening speech from beginning to end; and if he warmed up slightly towards the end of the proceedings, when replying to the shareholders' comments, it was plainly with an effort. Everybody must sympathize with Colonel Makins in his plaint that for some time past his official position has not been a "bed of roses." Nobody seeks to attach to him personally one shred more responsibility than belongs to him; but he would be the first to admit that, holding the position he does, he must take the rough with the smooth, the hard knocks with the compliments.

To return, however, to the question of the position of the Company, which is notoriously uncomfortable. It cannot be argued by the most ardent admirer of the Horseferry Road Administration that Friday's proceedings were of a character to remove from the public mind the bad impression created by the publication of the accounts exhibiting the results of the last half-year's working. We published last week the statement that for the past three half years the Company have paid away £430,000 in excess of their earnings; and the Governor could not deny the truth of the impeachment. All that he did was to assert that "this is not quite the right way to look at the facts." But the facts remain; and everybody has a right to draw such logical inferences from them as he pleases. It may be questioned whether, if Colonel Makins himself saw the same facts in connection with another Company of which he did not happen to be a Director, he would be quite so satisfied with their appearance as he now professes himself to be in the instance of the Chartered figures. However this may be, he was not long left in doubt on Friday as to the appearance of the Company's affairs in the eyes of some other gas directors. His deprecatory speech upon the report and accounts was directly followed by a damaging criticism from Sir F. Mappin, who was as moderate in language as he was weighty in matter, and whose remarks were considered as calling for immediate answer from the chair. Sir F. Mappin made one slip, which was, of course, pounced upon by Colonel Makins. He seemed to object on principle to the increase of a Gas Company's capital, without making allowance for the fact that a regular increase of capital obligations is necessitated by the extension of their business. This laid him open to the retort that although the actual amount of the capital of The Gaslight and Coke Company is increasing, it has been really reduced in proportion to the work done. Apart from this portion of his criticism, Sir F. Mappin effectually drove home his main argument that the conduct of the Company's affairs is not businesslike, with all the calm forcibleness of which he is master. The second critic of the Board was Mr. George Livesey, who this time, speaking metaphorically, "took off his coat," and set himself to punish The Gaslight and Coke Administration with as little ruth as they have shown to him, or, as he argues, to the general public. Mr. Livesey did not try to weigh out the blame for what he cited in proof of the mismanagement that reigns in the undertaking; among the individuals who may be supposed to be culpable; but he denounced the whole Horseferry Road system and its results in the strongest terms he has ever used upon such an occasion. Feebleness towards Unionism rampant at Beckton, and extravagance of capital and expenditure, were the chief points of Mr. Livesey's indictment; and he spared neither names nor figures to prove his case. The impression created by his speech, which was only met

in part by the Governor, was that there must have been something extremely injudicious in the management that estranged such an authority from the interest of The Gaslight and Coke Company, and then put at his disposal such weapons for attack.

For it is idle to attempt to dispose of the existing state of affairs by saying that Mr. Livesey has been soured by the behaviour of the Chartered people in the Nine Elms case, and that it is not "good form" for Chairmen of Gas Companies like the South Metropolitan and the Sheffield United to go to the Chartered meetings and make things unpleasant for the Directors and the management generally. We are also accused of rooted antagonism to the Chartered administration; and there is no difficulty in understanding what Colonel Makins means when he talks scornfully about the criticisms of irresponsible people and outsiders. It might be asked, Where is criticism to come from, if not from without; and when is it irresponsible? Colonel Makins will never get rid of criticism in that way. Criticism is responsible to truth and fairness, and to no other standard. The late Mr. Vaughan Richards, Q.C., never complained of critics, whose office, he admitted, is a very necessary and proper one; but he did his best to meet reasonable objections in a reasonable way. So far as the JOURNAL is concerned, if it is to be accused of unfriendliness to whatever undertaking or institution it may have occasion to censure, so be it; we must endure the reproach of all who think their name ought never to be mentioned except to receive undiscriminating laudation. With regard to the attitude taken up in respect of Gaslight and Coke affairs by critics like Sir F. Mappin and Mr. Livesey, it may be asked what their words would be worth if untrue. Why cannot the Horseferry Road authorities bid even envy and enmity do its worst? If there is a Fool's Paradise for Chartered shareholders, and if they must never be aroused out of it on any pretence whatever, then, of course, everybody who knows the truth should be kept away from Horseferry Road meetings.

It is easy to understand why people who suspect the Directors of The Gaslight and Coke Company of bad management will neither keep silence out of consideration for persons, nor absent themselves from the meetings, which are the only opportunities for telling the Directors what shareholders think of them. Colonel Makins is never weary of boasting about the magnitude of the Company's operations; but magnitude has other consequences than merely being wondered at. In the investing world of the City of London, gas stock means Gaslight and Coke stock. The City practically knows no other; nothing else in the way of gas property is big enough to make a market. Consequently, the course of this representative stock is everybody's concern. Moreover, there is the price of gas, and the interest of the public in it. What more likely to draw the unfavourable attention of the London County Council, the Board of Trade, and Parliament to the condition of the Metropolitan Gas Supply, than the fact of the largest London Company, with the best district, being unable, through mismanagement, bad system, or other internal cause, to sell gas for less than 6d. or 9d. per 1000 cubic feet more than the other Companies? What right have the Chartered administration to take this extra payment out of the pockets of the consumers in their district? Such a state of things really constitutes a common danger. Criticism, whether friendly or hostile, can only draw attention to facts as they exist. It does not create the troubles which it reveals; neither can it remove them. Mr. Livesey told the Chartered Directors last Friday that if they had not been protected by statute in the enjoyment of an assured position (which he as good as charged them with having abused), they would long since have been driven to put their house in order. Either this indictment is true or false. If false, it will recoil upon Mr. Livesey's own head; if true, the wrong will bring its punishment, whether the exposure is due to Mr. Livesey or to anybody else. It is certain that unless matters look different at Horseferry Road six months hence, the consequences will be very serious.

The South Metropolitan Report.

IN another column will be found the report of the Directors of the South Metropolitan Gas Company, which accompanies the accounts relating to the past half year, and which have been issued in view of the meeting to be held on the 18th inst. It appears from the report that the expectations of the Board, communicated to the proprietors at the last meeting, of a deficiency of revenue in consequence of the high price of coal, have been realized. This deficiency is actually £52,301, due to an advance of £68,000 in the cost of coal, and about £15,000 additional for labour; but coke having brought in more money, and the sale of investments having resulted in a profit of £16,691, the reserve fund has only been drawn upon for £35,610 in order to pay a 13 per cent. dividend and the damages in the Nine Elms case. The Directors remark that they have refrained from raising the price of gas, preferring to sell at 2s. 3d. per 1000 cubic feet and temporarily have recourse to the reserve, in the hope of being able to buy cheaper coals before long. The increase of gas consumption in the Company's district is very great—partly, of course, owing to the exceptional weather; but, at any rate, additional works will have to be hurried forward to meet the demand. A remarkable paragraph of the report deals with the profit-sharing scheme, and states that workmen's savings amounting to £2966 have been left with the Company, and that when "C" stock was offered for sale in small lots last August, no less than £1657 of it was bought by the men. The Directors are justified in their belief that these facts will be interesting to the shareholders. They are, indeed, among the most interesting statements of the whole document. The report explains why the Directors decided to recommend a dividend after the rate of 13 per cent., which, they significantly say, has every prospect of being maintained. We shall deal with the accounts next week.

Profit-Sharing.

TOWARDS the end of last week, Mr. J. Lowry Whittle's report to the Board of Trade on Profit-Sharing was issued as a parliamentary paper. We shall probably deal with this publication more fully on another occasion; and for the present are unable, through pressure on our space, to do more than mention the fact of its appearance, and state the nature of its contents. The writer remarks that the term "profit-sharing" has found such general acceptance in recent years, that he has adopted it in preference to "industrial co-operation," "industrial partnership," "class co-operation," and many other names which have been suggested from time to time for the same thing. It means, as thus used, "various business arrangements, all having this principle in common—that the people engaged in the concern, or an appreciable portion of these workers, shall receive, in addition to their salary or wages, some pecuniary advantage, prospective or immediate, to be paid out of the net profits in any year in which net profits are made." The idea, we are informed, was first brought into operation in France, about the year 1848, at a period when a good many other changes were made in public affairs. It became popular in England some twenty years later. This history, we gather, is taken from a French source, and may not improbably be open to correction; for French writers, as a rule, do not know everything that goes on in other countries. The first portion of the report relates almost exclusively to French and Swiss examples. Afterwards many English instances are given. The arrangement in force at the works of Messrs. Tangyes, Limited, of Birmingham, is described as an "illustration of an effort to arrive at something like the stock system;" but it is criticized as being rather a fixed bonus or system of rewards than profit-sharing properly so called. The Whitwood Collieries experiment of Messrs. Briggs, started in 1864, is also mentioned among the older schemes. Of the newer experiments, that inaugurated in the past year by the South Metropolitan Gas Company is described as a "celebrated recent instance." After showing the close connection of the scheme with the sliding scale of the price of gas and rate of dividend, Mr. Whittle admits that "it may be contended that this offer is rather a liberality of the Company than profit-sharing properly so called; but the conditions affecting the cost of gas alter from time to time, as, for instance, the price of coal, which has recently risen. If by this arrangement the Company succeed in avoiding or deferring an increase in price of gas, they will at once be able to secure some advantage from the system; and Mr. Livesey, the Chairman, thinks there are many signs of such a result. There is greater diligence; suggestions for economizing expense are from time to time made by the men; and a new interest is

"shown in the work. These are results which, in his "opinion, no mere skill in superintendence could bring "about." There is an appendix to the report containing the text of the rules and the figures showing the working of the scheme up to the present time. Evidence obtained from Mr. Frank Livesey upon the economy of the scheme is given. He remarks that the men now take a keener interest in the management of the sick fund, and help to protect the property and forward the business of the Company in various important details. Every manager of a large industrial establishment knows the importance of detail; and it is in the small things, which aggregate into such large considerations, that unity of interest between employers and employed is likely to be most conspicuously shown. The report discusses as well as records examples, and is therefore pleasant reading. Marginal references are given to authorities, so that the reader desiring to pursue further the subjects incidentally dealt with can do so. Mr. Whittle mentions the South Metropolitan strike, only to conclude that "there is no "essential antagonism between the ordinary work of a "Union, between many of the objects which the *older* "Trade Unions have pursued, and the policy of profit-"sharing." The word which we italicize in this quotation is the most significant in it. The report should be in the hands of all employers of labour, and especially of all gas managers, if only for the sake of the South Metropolitan Company's figures.

Issue of Additional Stock by the South Metropolitan Gas Company.—The Directors of the South Metropolitan Gas Company are about to offer for public competition £22,000 of 5 per cent. debenture stock, and £33,500 of ordinary "C" stock of the Company. It will be put up to auction in large and small parcels, to suit the convenience of all classes of investors.

Death of Mr. Alderman Bower, of Liverpool.—On Saturday, the 31st ult., a gentleman who was for a long time one of the foremost figures in the municipal and social life of Liverpool was removed by death. After a long and painful illness, Mr. Alderman Anthony Bower, whose name is intimately associated with the water supply of Liverpool, expired at his residence at Heswall, in his 71st year. The deceased gentleman was by profession an engineer; and was senior partner in the firm of Messrs. G. Forrester and Co.—a large iron-founding concern which about three years ago was converted into a limited liability Company. His connection with municipal politics began more than 20 years ago. He entered the Council as a Conservative in 1872; and in 1887 was elected an Alderman. His abilities and attainments as an engineer were quickly recognized; and he had no sooner joined the municipal body than he was invited to assist in the deliberations of the Water Committee, of the Executive Sub-Committee of which he afterwards became Chairman. In 1878 the New Supply Sub-Committee was formed for the purpose of investigating schemes for a supply additional to that obtained from Rivington and the local wells. Of this Sub-Committee, Mr. Bower was Chairman; and in that capacity he prepared an exhaustive report, describing in detail the rival Vyrnwy and Haweswater schemes, the respective merits of which were then being hotly discussed. He recommended the adoption of the Vyrnwy undertaking, which, on June 17, 1879, the Council finally adopted. Mr. Bower then accepted the chairmanship of the Parliamentary Sub-Committee charged with carrying the Vyrnwy Bill through Parliament. Mr. Bower gave evidence in support of the Bill before Committees of both Houses of Parliament; and on the appointment of the Vyrnwy Works Sub-Committee, he became Chairman of that also. Indeed, he adhered to the scheme throughout with unwearied energy and tenacity; overcoming all opposition by persistent advocacy and evident conviction of ultimate success. On the death of Mr. J. H. Wilson in 1881, the Water Committee appointed Mr. Bower their Chairman, a position he vacated only a short time ago—on account of failing health. He gave the Vyrnwy works his personal supervision, and placed his extensive knowledge as an engineer unreservedly at the service of the Corporation; but he also did good service on the Finance, Library, and Parliamentary Committees. By his death, the city has lost a thoroughly practical, industrious, and useful public man. At the meeting of the Council last Wednesday, the Mayor (Mr. J. B. Morgan) and several of the members referred in suitable terms to the loss they had sustained by Mr. Bower's removal; and a vote of condolence with Mrs. Bower in her bereavement was passed. The Council adjourned for an hour, in order that the members might attend the funeral, and pay a last tribute of respect to their colleague's memory. At the meeting of the Water Committee on the previous day, it was resolved to enter upon the minutes a recognition by the members of the ability with which their former Chairman had presided over their deliberations, especially in connection with the Vyrnwy scheme, and of his invariable impartiality and courtesy to his colleagues.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 268.)

THE Stock Markets continue unusually quiescent and inactive. "Once bitten, twice shy;" and the scar of the last wound received appears to be so fresh in the minds of the public, that they are exhibiting now a very large bump of caution. At the same time, it must be admitted that, although some disquieting elements have abated, others have increased; and in some cases have approached nearer home. The passion for revolution which seems to possess the Iberian temperament, has spread across the Atlantic from the South American republics to the shore of their Mother Country; and although the disturbance at Oporto was promptly quelled, yet the incident disagreeably reminded us of the instability of political affairs. So, on the whole, the markets have been rather depressed. Gas securities as a group have been somewhat less active; and quotations have remained wholly unchanged, except Imperial Continental and Gaslight and Coke. The "A" has recovered 2½ more from its previous fall. On Tuesday it was done at 239 "specially," and the following day it touched 244; but that figure was not approached again until Saturday, when 243 was marked. Considerable business was done in the 4 per cent. debenture stock at middle figures. The 6 per cent. debenture rose 1. Judging from the business done in "A" on Saturday, the market was not unfavourably affected by the proceedings at the Company's general meeting on Friday. A great deal of difference was naturally apparent in the opinions of those who spoke upon the position of affairs; but whether all the opinions expressed were equally entitled to the same weight is another matter. Our own opinion, unbiassed by any interest or any motive save devotion to the welfare of the gas industry in general, has been expressed already, and remains unchanged. Our hope is that we may find six months hence that it was erroneous. The South Metropolitan report and accounts are out, and show that the Company recover 1 per cent. of the dividend which the cost of the strike had reduced. In order to pay the increased dividend, they will have to take £29,400 out of the reserve fund. That fund will then stand at £115,000, equal to about 4½ per cent. upon the entire capital of the undertaking. Further capital will be raised next month to the extent of £33,500 "C" and £25,000 debenture stock. The prices of all the Company's issues in the market remain unchanged. Suburban and Provincial Companies are also unaffected. Foreigners show the only retrogression, by a drop of 1½ in Imperial Continental. The rest are steady. The investment value of Europeans must remain blank in the Stock List, as the 4 per cent. dividend recently paid is only an interim one. The Directors, however, confidently acticipate being able to pay another 6 per cent. next July; and the shares may, therefore, be speculatively regarded as paying 10 per cent. Water is active, and still on the rise.

The daily operations were: Gas was fairly firm at the opening on Monday; but remained quiet all through the day, and nothing moved. Water was brisk, and rose freely—an advance of 2 each being made in Kent, and in both Lambeths. Gas inclined to more activity on Tuesday. In Gaslights, "A" improved 1; and the debentures were steady. Water was quieter. On Wednesday, Gaslight "A" was at its best, and rose 1 more. Other business was not very remarkable. West Middlesex Water was 1 higher. There was general activity in Gas issues on Thursday; and prices were a good average. Gaslight 6 per cent. debenture rose 1. Transactions were restricted on Friday, though Europeans were in some demand. Water was inclined to rise. Saturday's business was fully up to the average. Gaslight "A" buyers were 1 higher; but Imperial Continental receded 1½. Water was unchanged.

ELECTRIC LIGHTING MEMORANDA.

An Important Civic Ceremony—The Hitch in the Proposed Electric Lighting of Dublin—The Lack of Demand for Electro-Motors.

WITH a portentous flourish of civic trumpets, the first public step was taken on Tuesday last towards the realization of the scheme of the Corporation for lighting the streets of the City of London by electricity. The old Corporation dearly loves a "function;" and, to please it, the latest development of applied science must be made contributory to some more or less appropriate ceremony. In the case of a building, this is easily done; for a "foundation-stone" can always be laid somewhere, no matter whether it is wanted for the structure or not. The genius of civic pomp has been sorely taxed in modern times to keep abreast of material civilization. The City of London has not as yet gone into very many novel enterprises requiring ceremonial inauguration—this of the electric lighting being perhaps the strangest; but many other British municipalities have been hardly beset to find pegs—in sewage farming, gasholder making, and similar unpicturesque undertakings—whereon to hang the indispensable opening celebration and the inevitable banquet. The Corporation are to be congratulated, however, on having made the very most on Tuesday of a very small opportunity. As the electric lighting plant is to be set up

outside the City, there was no foundation-stone to be laid for any building, and not even a steam-valve to be solemnly opened by the Lord Mayor. It would scarcely have been dignified in the Chief Magistrate and the Sheriffs to have given the first haul to the insulated cables that have to be dragged through the underground conduits; but somebody had the happy thought that a "main junction-box" for the electric lighting cables would be required somewhere within the City limits; and that, by a little contriving, the adjustment of a stone in the building of this important structure could be worked up into a sufficiently imposing civic function to satisfy a not too particular Lord Mayor, and be made the occasion of a sorely-needed advertisement of the scheme. This was accordingly done; and we cannot learn from the newspaper reports that even at the ceremony or the subsequent luncheon, whereat several well-known personages collected for the purpose vied with one another in nobly puffing the schemes, did anybody laugh. The fact, which has subsequently transpired, of the Lord Mayor being upon the Board of a Company floated to work the City lighting contracts, sufficiently explains his appearance on this occasion.

The Corporation of the City of London cannot be said to have been in any hurry over their electric lighting arrangements, nor are their favoured contractors particularly hasty in reaping the rich crop which they pretend to think is awaiting them; but, to judge from the latest accounts, the prospective City of London electric lighting companies' shareholders will be pocketing their 10 per cent. dividends, or be safe in the hands of a receiver, before the people of Dublin see a glimmer of the light. With all the gravity that an Irishman can assume when discussing a potently ludicrous subject, the Editor of the *Freeman's Journal* inquires of the Dublin Corporation "in what position exactly the electric light question now stands." A Committee of the Corporation have the business in hand; but they meet for discussion with closed doors, apparently because the members are so sharply divided upon some of the questions that have to be settled in regard to the matter that their debates are unfit to be reported. The *Freeman's Journal* does not blame the Committee for this; but gently hints that the fun has lasted quite long enough, and that the public outside are tired of waiting to congratulate the survivors. It is more than suspected, also, that it is not all public spirit that is at the bottom of the prolonged wrangle; but that the fiercest fighting has raged over the bestowal of the contracts; We are assured by the same authority which gives currency to this rumour, that the pick of the business men of Dublin are in the Corporation—a circumstance which we should certainly not have discovered from their proceedings. But if it takes the best business talent of Dublin five years to get into such a muddle over electric lighting that their mutual recriminations on the subject are unfit for publication, what are we to think of the men and the matter concerned? The cream of the situation is the fact that the Corporation have a Board of Trade Licence for electric lighting, which will lapse if not carried into effect by November of the current year. As yet there is no sign of any work being done; and it appears to be in the highest degree improbable that the Licence can be saved.

A bitter complaint goes up from a certain order of electricians on the subject of the non-appearance of those small electro-motors for minor industrial purposes which were expected to be so greatly in demand when central supply stations, selling electro-motive force by meter, had been established. When these stations were things of the future, and electricians were in the happy position of being able to ascribe all their discouragements to Mr. Chamberlain, they used to talk largely of the way in which electro-motors would come into use for town industries, if only the necessary energy could be obtained. According to these imaginings, gas-engines were to go out of fashion, and an infinite amount of work previously done by force of muscle—such as coffee grinding, sewing-machine driving, machine hair cutting, &c.—would be performed by small electro-motors. Well, the central stations have come; but not the electro-motors. It is complained that when gas-engines were novelties, many enterprising shopkeepers made use of them *coram publico*, for the sake of the attraction. Nothing of the kind is done with electro-motors, however; the whole number of such appliances working to-day in all London being quite insignificant. The electricians ask why this is, and why it does not occur to enterprising grocers to drive coffee-mills by electricity in their shop-windows, and to advertising printers to blazon notices to the effect that all their work is done by the new expression of power. The answer would probably be that the advertisement would hardly pay for itself, seeing that reliable work is what business men desire above everything; and reliability is precisely the last virtue that the tradesman admitting dependence on electrically-transmitted power would be able to claim.

Messrs. Tangye Bros. have contributed £5000 towards £100,000 which is being raised for the purpose of building a new general hospital in Birmingham.

Institution of Civil Engineers.—The monthly ballot at the ordinary meeting of this Institution last Tuesday resulted in the election of 13 members and 47 associate members; among the latter being Mr. W. E. Price, the Engineer and Manager of the Hampton Court Gas-Works.

THREE BELATED PAPERS.

"BETTER late than never" may well be the exclamation of members of the Incorporated Gas Institute upon receiving the volume containing the report of the Transactions for 1890. It is not our intention to revive discussion upon these proceedings *en masse*, or to debate any of the technical portion of them which has already been published in the JOURNAL. It happened at Ryde, however, for reasons that need not be particularized, that three of the papers intended to be submitted to the meeting were "taken as read," which means, of course, that they were put out of sight, and therefore out of mind, until the appearance of the printed volume of Transactions. Papers that are treated in this way at meetings of Technical Societies are sometimes written for the purpose; being heavy and unreadable compilations of statistical or mathematical information which nobody wants to discuss, however useful the facts may be for reference. A weak paper that has got itself accepted by accident may also be served in this fashion without injury to anybody, since no time need be wasted over it when once it has been committed to the printed volume which serves for its tomb. Unfortunately for the Ryde meeting, however, necessity compelled that papers dealing with highly interesting and debateable matters should be thus stowed away out of notice; and the long delay that intervened betore the appearance of the Transactions has been sufficient to consign these communications to undeserved oblivion, unless we perform the kindly office of disinterring and placing them in the light of day.

The papers in question, which are collected together in an Appendix to the Transactions, are three in number. One is by a Mr. A. F. Guy, who signs himself Associated Member of the Institution of Electrical Engineers, upon the question whether or not gas undertakings shall supply electricity. It is a pity, if The Gas Institute needed information on this matter, that they did not arrange for it to come from some recognized authority. Unfortunately, Mr. Guy, whose name is not familiar as that of an electrical writer, has not increased his reputation, whatever it may have been among his friends, by this paper, which is to the last degree windy and inconclusive. Moreover, by this time it is quite out of date; and therefore we have no hesitation in describing it as not worth reading. The next of the papers in the Appendix which we shall notice is one by Mr. R. S. Moss, of Accrington, on "Illuminating Water Gas"—one of the most interesting topics, it might have been thought, for discussion by a meeting of gas managers from all parts of the Kingdom. It is much to be regretted that Mr. Moss's paper was not read last June, because it deals with several phases of the water-gas question which were fresher then than they are now. A good deal of Mr. Moss's space is occupied with a description of the Van Steenbergh plant and results, then working at Knightsbridge. He proceeds to mention the Avery process, then working experimentally at Beckton; and the Stapp process, similarly on trial at Clyde Wharf, Victoria Docks. It is noticeable that we now speak of all these experiments in the past tense; and, as a matter of fact, we believe that not one of them is in operation anywhere at the present moment. Mr. Moss was very sanguine about all of them seven or eight months ago; but he would probably write in a different strain now. Yet, notwithstanding the fact that the summer-time experiments cited by Mr. Moss as earnest of the immediate introduction of water-gas plant into British gas-works have in all cases "gone off" without leading to any permanent results, they do not settle with a decided negative the question of water-gas as an auxiliary in British gas-works. The Avery process, for example, never commended itself to the judgment of anybody who knew the difficulties that water gas has to overcome before it can rank with coal gas in this country. The Stapp system, again, had nothing to recommend it, in comparison with others which could be fitted up at a less cost; and although the experiment at Clyde Wharf ran away with a good deal of money, nothing definite was established by it. The Van Steenbergh venture, again, was wofully mismanaged from first to last. The construction and working of the generator are both extremely simple, and the results obtained from it by Professor V. B. Lewes go to show that it has some valuable properties as a gas-making apparatus; but it was erected in a bad place to exhibit its full powers. Nothing like a continuous run could be carried out with it; and consequently the curiosity of practical gas manufacturers was left unsatisfied upon a most important point. Curiously enough, no public demonstration has yet been made in England of the capabilities of a good representative of the Lowe type of water-gas plant, which has the chief vogue in the United States. If, owing to facts beyond his control, much of Mr. Moss's paper is now ancient history, it was modern enough at the time of the meeting.

For many reasons, Dr. L. T. Thorne's paper upon Tatham's process of oxygenizing oil gas intended for illuminating purposes, is the most interesting and important of the contents of the Appendix—or, for that matter, of the Transactions. It has the advantage of dealing with a subject that has hardly as yet ripened, to say nothing of passing out of date. We have described the Tatham process, as exemplified by the aid of experimentally-made materials; and Dr. Thorne's paper contains all the chemistry that may be considered necessary to establish the system upon a safe basis. For this reason,

perusal of it is to be recommended to the many gas managers who are at the present time inquiring into the subject. We have no doubt that a great deal more will be heard of "oxy-oil gas" before long. Of course, what everybody interested in the matter wants to know is how it is likely to turn out when made upon an actual working scale, and used—say, for carburetting—in a gas-works in the ordinary way. There is no difficulty about making oil gas upon any required scale. This part of the business may be done in any gas-works where a few retorts can be spared. Putting an iron tray in the bottom of a clay retort, to be frequently changed and cleaned from carbon, makes the latter as good an oil-gas retort as can be had. Only one-half of the weight of the oil put into the retort will reappear as gas; but that is as high a duty as Pintsch gas makers, with all their skill and experience, can obtain in the long run. We also know that Mr. Valon can rig up an efficient oxygen-generating plant in the space of an ordinary setting of coal-gas retorts, which will produce oxygen at the expense primarily of a little coke for the furnace. The question is, how these possibilities can be combined in a practical oxy-oil gas plant suitable for ordinary gas-works. Upon this point Dr. Thorne has, of course, nothing to say. Meanwhile, as the Brin oxygen people, who control the Tatham patents, are very quiet, it is quite likely that they have something in preparation which will interest coal gas companies when the proper time for disclosure arrives.

The real *crux* in Tatham gas making, as in making carburetted water-gas, is the oil. Dr. Thorne contemplates a supply of crude petroleum oil in this country at 55s. per ton, which is rather less than 2¼d. per gallon. Even if a crude petroleum oil could be put into British gas-works at this figure, it is by no means certain that this would be the kind of oil that gas managers would like to have upon their works. Crude oils are dirty, pitchy, and sulphurous to an unimaginable degree. More than half the weight of a fairly good sample of petroleum crude would remain as coke, pitch, tar, and water after an attempt to carbonize it. These refuse matters are worthless in gas-works, and it is difficult to see why they should be preferred to clean oil. But even with rectified oil, as already stated, one-half of the weight of the raw material never becomes gas at all. If this loss could be avoided, oxy-oil gas would assume a different aspect; but the same improvement would bring the water-gas system, now discredited by the cost of carburetting, into dangerous competition with it.

Oxy-oil gas is very quickly made; and it is so good that a very little of it goes a long way in bringing up the illuminating power of a huge bulk of coal gas. Until the matter has been further illustrated in practical working, however, it is difficult to see how it bears upon the labour question, or the emergency of a suddenly increased demand, as water-gas undoubtedly does. The chief recommendation of a water-gas plant, in the eyes of a British gas manager, is the fact that the generator will stand in a corner of the retort-house, out of everybody's way when not wanted, and yet only needing the red-hot contents of three or four retorts to be drawn directly into it, and the air-blast turned on for a few minutes, to be ready for making gas in almost any desired volume. In a small or moderate-sized works, the manager himself, by the aid of plant of this kind, and without calling off a single man from his work, could produce as much gas as all his retorts are making, by simply turning a tap or two on and off at intervals of a few minutes. Even if the gas so made costs rather more for materials than the coal gas, it is worth something to have such a reserve of manufacturing power for an unexpected emergency. Is there anything corresponding to this in the oxy-oil gas process? At first sight, it cannot be said that there is. Its friends and supporters must therefore be prepared to meet this objection, which is likely enough to be urged by critics who would never employ water-gas plant for any other purpose than that of argument. "Very good gas," such a critic would admit to Dr. Thorne, or anybody else who might happen to be recommending the Tatham system; "but it doesn't make a great bulk of gas quickly, like a good water-gas plant." Then to a water-gas advocate the same critic would say: "Yes, it produces gas quickly; but the gas is not so good as that made by the Tatham process." This is the kind of objection that some people are rather fond of making. It sounds clever to play off one novelty against another, so as to avoid committal to either. Dr. Thorne says something in his paper about combining oxy-oil gas with water gas by diluting it with two or three times its bulk of the latter, in order to make a lighting gas of about 16 to 18 candle power; but it is doubtful if this could be done at the necessary low price. He also states as one of the recommendations of the Tatham process, that it uses a crude or refuse, and therefore low-priced, oil. This latter claim, as will be seen from what has already been stated, is illusive. The oil used to make the gas which is to receive the admixture of oxygen, must be the same as is used in making Pintsch or other oil gas. It would be loading the new system unfairly to make it carry all the dirt and sulphur of crude oil, for which there is no necessity. It is high time, however, that Dr. Thorne or some of his associates had something fresh to tell us about the behaviour of oxy-oil gas in ordinary working. The experiments which gave him the data he dwelt upon in June last were conducted upon a very small scale; and, though good enough for the time, they are not of really enduring interest.

NOTES.

The Illuminating Power of the Edges and Sides of Flat Oil-Lamp Flames.

Mr. Alfred M. Mayer has contributed to the *American Journal of Science* a paper on the illuminating power of flat petroleum-lamp flames in various azimuths. The experiments were conducted with two varieties of flat flames—one being the flame of a Hitchcock lamp, in which combustion is maintained by a blast of air driven against the flame by a fan moved by clockwork; and the other a flame of an ordinary flat-wick lamp. The latter flame was surrounded by a chimney; the former was not so enclosed. The following results were determined photometrically for each flame at three of the azimuths for which observations were taken. The angles were measured from the plane of the flat flames, and the results are expressed in standard candle power.

Azimuth.	Hitchcock Flame.	Ordinary Flat Fame.
0° ..	9·8 ..	6·6
50° ..	15·8 ..	10·25
90° ..	15·6 ..	10·6

It therefore appears from these experiments that the edges of the Hitchcock flame and of the ordinary flat lamp-flames give respectively about 37 and 38 per cent. less light than the flat surface. This observation favours the use of ground or clouded glass globes for all kinds of flat flames, whether of oil or gas, not only for the sake of appearance, but also for equalizing the light radiated in all directions.

The Air of Towns.

The Town Gardening Section of the Manchester Field Naturalist's Society have appointed a Chemical Sub-Committee to carry out a systematic series of analyses of the air of Manchester and Salford, from samples collected simultaneously at different points. Seven collecting stations have been settled; and the observations are designed to afford definite information on the following points: (1) The composition of the air in densely-populated, as compared with thinly-populated districts; (2) the relation between atmospheric impurities and prevalent sickness and mortality; (3) the amount and distribution of noxious ingredients specially injurious to plant life, such as sulphurous acid; (4) the extent to which smoke and noxious gases are due to dwellings and factories respectively; (5) the nature of fog, and the chemical character of the air during the prevalence of fogs. At a recent meeting of the Society, Dr. Bailey reported that the tests had been commenced. It had been ascertained, he said, that the snow carried to the ground large quantities of sulphuric and hydrochloric acids, and also some of the elements of sewage. The depositions on leaves collected at the different observing stations were in amount directly as the population, and the greatest injury to plant life was found to be due to emanations from private chimneys. The Committee estimated that every day 2 tons of "blacks" and 3 cwt. of sulphuric acid are deposited per square mile of the Manchester city area. The Royal Horticultural Society have a Committee to do similar work for the air of London.

The Strength of Iron and Steel.

In specifications for structural iron and steel, and designs of the structures in which these materials are to be employed, it is usual to so balance the quality of the materials and the strains to which they are to be subjected as to ensure that the permanent or maximum load does not exceed 5 tons per square inch for metal of ordinary quality, and 6 tons per square inch for exceptionally good material. This is supposed to be assumed by requiring test bars to withstand tension up to a fixed point, which may range from 22 tons per square inch for soft wrought iron up to 38 tons for steel, and to show (say) 35 per cent. of reduction of area at the fracture, and 20 per cent. elongation in 8 inches. It has been stated, however, on the authority of Mr. W. B. Marshall, who referred to results of miscellaneous tests made in the ordinary course of workshop practice during the past six years, that for very various qualities of material, in which the ultimate stress ranged from 18 to 34 tons per square inch, and the elongation from 2 to 32 per cent., the elastic limit only varied from 13·5 to 16 tons per square inch. This means that, whatever may be the ultimate strength of the materials composing the different members of a structure of iron or steel—like a bridge, pier, or gasholder—if it is strained much beyond 2½ times the usual safe load, it will take a permanent set. Some allowance ought to be made in the case of intermittent loads for the fact that repeated applications and removals of such loads increase the apparent elastic limit, until it even approaches the breaking-point, when the material will be as brittle as glass.

A New Jointing for Soft Metal Tubing.

An ingenious method of jointing soft metal pipes for gas or water, for which many advantages are claimed, has been patented by Messrs. Smith and Cooper, and the invention is being introduced by Mr. B. Cooper, of Rhodes Mill, Middleton. It consists in forming, on the two ends of the pipe to be joined together, a right and a left hand screw-thread respectively, and then screwing them up with a specially-made coupling. A small case of tools, easily carried in the pocket, contains all that is requisite to enable a fitter to do work for which a plumber is usually called in. In the first place, after the pipe has been cut

off square, a diminishing cap is placed over the end, which by a few blows of a hammer compresses the open end into a reduced conical form. A nut having an internal screw-thread, right or left handed as the case may be, is then placed over this reduced end, which is swelled out again, and caused to take the impression of the thread on its outside by having a conical drift hammered into it. The pattern nut is then unscrewed; and both ends of the pipe having been treated in the same way, the screw coupling can be put on. The maker claims that by this means a joint in lead or compo pipe may be made in about one-fourth of the time required for soldering, that it does not require a skilled workman, and costs considerably less than joints made in the same kind of pipe in any other way.

COMMUNICATED ARTICLE.

THE CHEMISTRY OF ILLUMINATING GAS.

By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S.

LII.

PURIFICATION (*Concluded*).

The remaining process to which the gas is treated, after issuing from the washers and scrubbers, is that known for the sake of distinction as "dry" purification. It is conducted in large iron vessels—usually rectangular, but sometimes circular in section—known as "purifiers," the construction of which, with the lids sealed in a hydraulic lute, and ledges to receive the grids for supporting the layers of material used, is generally understood. These must be accompanied, of course, by proper connecting pipes and valves for directing the course of the gas through the various vessels as desired, and for throwing any vessel out of action when necessary, to admit of cleaning out and re-charging; and altogether, looking at the scale on which operations are now conducted, even a moderate-sized works using boxes as large as 20 feet square, capable of taking about 30 tons of material, this department affords scope for the highest engineering talent. The purifiers must be so placed as to admit of the whole of the pipes, valves, &c., being easy of access at any time. The lime-floor, where the lime is mixed, and the oxide-shed for the revivification of the oxide, must be so arranged as to admit of the transit of materials at the least possible cost for labour. Various mechanical appliances are now being brought into use in connection with these operations.

In small gas-works, the purifying boxes are contained in a building; but in large establishments they are merely roofed over, or perhaps placed entirely in the open. In arranging this, it must be remembered that the materials are employed in a moist state, and must therefore be protected to such an extent that their temperature should never reach 32° Fahr. According to the general experience, they should not be allowed to fall below 40°, as the activity of the purifying action is interfered with when this limit is reached. So it is well to place them in a building that can be closed in the winter, and opened so as to allow free ventilation when the weather permits. In the purifier-house it frequently happens that the same mistake is made as with previous parts of the plant—viz., endeavouring to retain old apparatus in use, which has proved ineffective on account of the gradual increase in demand, as supplementary or assistant to the newer and larger plant. If a set of four 15 feet square boxes proves insufficient, it often happens that two 25-feet purifiers are added, and used for oxide, it being considered that the small boxes will answer very well for lime, or for catch-boxes. The idea that a smaller vessel will do for lime is quite a mistake, if the carbonic acid purification is to be thorough; and the extra expense caused by the frequent changing of the small boxes, and by the heavier back pressure which they throw, is such as to more than compensate for the cost of replacing them with larger. Where future extensions are probable, it is a good plan to have the purifiers oblong instead of square. A box 16 feet by 12 feet can be converted into a 20 feet by 16 feet box by taking off one side, and inserting two rows of plates, with much less trouble and expense than that of enlarging a square box to a similar extent. In any case, the extension in the purifier-house should not be a half-and-half affair, but include an all-round increase in the size of the boxes, valves, and connections.

These remarks refer particularly to small country gas-works, where only one set of purifiers is used, and the purification is directed merely to the removal of sulphuretted hydrogen; this impurity being tested for at the outlet in the usual way. In larger towns, where the sulphur clauses are in operation, there are three sets of purifiers, directed respectively to the removal of carbonic acid, carbon disulphide, and sulphuretted hydrogen; the purification being complete as regards the first and last, and limited to a certain standard as to the sulphur compounds. Sometimes where the latter need not be considered, an attempt is made at lime purification. A lime purifier is changed periodically; and it is supposed that the removal of the carbonic acid is fairly complete. But it is no more possible to take out this impurity without regular systematic testing, than it would be to deal with the sulphuretted hydrogen. In many works where a lime box is changed once a month, or once in six weeks, it would be found by daily testing that, within a few days after making the change, traces of carbonic acid would escape; and these would gradually increase, until within a week or a fortnight there would be no difference in the percentage of carbonic acid present either at the inlet or the outlet.

The old plan was to have small boxes with several layers of grids, upon which the material was thinly spread. Layers more than 6 inches in thickness were found to cause back pressure. But further experience showed that this was either due to imperfect condensation, allowing tarry matters to go forward to the purifiers and clog the materials, or to want of sufficient area. Now that larger boxes are used, and the gas is thoroughly condensed and washed, the four or five layers in the old boxes are often replaced by two in the new; and many gas engineers use the bottom row of grids only—filling in the material right up to the top edge. They thus greatly increase the bulk of material put into a box, and consequently the quantity of gas that can be passed through it before it must be shut off for renewal.

The chemistry of gas purification—including the analysis of the oxide and lime used, and their valuation as gas-purifying materials, the best methods of preparing for the purifier, and the testing of the spent stuff, so as to find out the quantity of impurity it has taken up—has always been a favourite subject with gas engineers, as well as with chemists and scientists generally. Probably the first who attempted a general view of the science of the question was the Rev. W. R. Bowditch, though there is reason to believe that Hills, Laming, Croll, Lewis Thompson, and others, knew nearly as much about the chemistry of gas purifying as is known now. So much is shown by what will be found in the early volumes of the JOURNAL Then we come to the elaborate researches of the London Gas Referees; and more especially those of the late Mr. R. H. Patterson, embodied in his voluminous writings on the subject. Mr. George Anderson, Messrs. G. and F. Livesey. Mr. Charles Hunt, and others, have enriched the Transactions of the British Association of Gas Managers and The Gas Institute with a large amount of information; Mr. Lewis T. Wright has bestowed a great deal of painstaking investigation upon the experimental and the laboratory part of the question; and the present writer has frequently endeavoured to direct attention to various points connected therewith. The introduction, too, of what is known as the "air" or the "oxygen" processes has had the effect of bringing out a valuable amount of research that cannot fail to be useful, apart from the question to which it was specially directed. All these papers, articles, &c., besides many others too numerous to mention, will be found in recent volumes of the JOURNAL.

The cost of purification has been gradually reduced until it has reached a figure that many regard as the *ne plus ultra*. Though other substances have been tried from time to time, lime and oxide seem to retain their position as the only materials that can be used with advantage in practice. Purification by means of liquids has apparently been carried as far as practicable; so it may well appear that there is no scope for further advancement. This will not be the case, however, so long as "rule-of-thumb" enters so extensively into the arrangements of our purifying-houses, as it does at present. It will only be when the action of each vessel has been carefully and accurately determined, by regular periodical analysis of the gas at the inlet and outlet, and when the conditions which determine the proportion of impurities remaining to be removed at the dry purifiers have been investigated and distinctly set forth, and the size of vessel that yields the best results has been fixed upon (instead of adopting the easily determined rule of "Have them as large as you can for the money," which I have had occasion to notice as so often applied in connection with modern gas-works plant), that it will be time enough to talk about having carried cheap purification with lime and oxide to its utmost limit. As things stand at present, it is possible that the excellent results already obtained are capable of still further improvement. It is only by a thorough and intimate knowledge of the subject that gas engineers can hope to be in a position to avail themselves of any new material, cheaper or more easy of application, that the continued progress of applied chemistry may place in their way in the future.

Mr. Alderman Glaister, J.P., has been appointed Chairman of the Bolton Corporation Water Committee, in place of Mr. Alderman Musgrave, deceased.

Death of Dr. Otto.—Although we are not very far in the year, our record of deaths is already long. Among those who have recently been removed, we have to mention Dr. N. August Otto, the inventor of the gas-engine bearing his name, who died in Berlin, after a brief illness, on the 26th ult.

Issue of Debenture Stock by the Brentford Gas Company.—The Brentford Gas Company are about to offer for sale by tender £46,875 of 4 per cent. perpetual debenture stock; being a portion of the additional capital authorized at an extraordinary meeting held on Nov. 25, 1881, under the powers of the Provisional Order obtained by the Company in that year.

Death of Mr. J. A. Radcliffe.—We regret to record the recent death of Mr. John Alexander Radcliffe, head of the firm of Messrs. Radcliffes and Cator, Solicitors, of Craven Street, Strand. Mr. Radcliffe's name came prominently before the readers of the JOURNAL in connection with the revision of the rules and the general affairs of The Gas Institute about two years ago; he having been requested to assist the Council with his legal advice in the then critical condition of the Institute. Mr. Radcliffe's firm are also Solicitors to the Institution of Civil Engineers.

TECHNICAL RECORD.

MR. W. C. YOUNG ON STANDARD SPERM CANDLES.

At the Meeting of the London Section of the Society of Chemical Industry yesterday week, at Burlington House, Piccadilly—Mr. TYRER presiding—a paper on the above subject, which contained the results of experiments of an exceptionally interesting character, was read by Mr. W. C. Young, F.I.C., F.C.S. The following is an abstract report of the paper and the discussion upon it.

Mr. Young commenced his paper by remarking that a common expression used in reference to sperm candles was: "I get very good results with them when they are properly used;" but it was difficult to get a clear definition of what was meant by "properly." For 23 years he had used candles daily, and had devoted much attention to them for the purpose of ascertaining the causes of their defects, and the means of remedying them. From time to time since 1876 he had stated his opinions on the subject in the "Correspondence" columns of the JOURNAL OF GAS LIGHTING; and in the number for April 2, 1889, would be found a letter in which he gave the following mode as the one in which candles should be used so as to give fairly uniform results: "No test should be taken with candles that had not previously been burnt until the tips of the wicks glowed, and then extinguished and allowed to cool two or three times." At the time this letter was written, it appears he had not made any systematic investigations on the subject; but he afterwards commenced a long series of experiments, which formed the substance of the present paper. He experienced great difficulty at the outset in devising some means by which a uniform volume of light could be produced at any moment for the purpose of testing the candles; but ultimately he succeeded very well by means of a simple apparatus, consisting of a screen of fine wire gauze fitted tightly to the rim of the gallery of a "London" Argand burner (such as is prescribed by the Gas Referees for testing common gas in the Metropolis), and extending 3 or 4 inches below—the bottom being closed by resting on the photometer case. The currents of air supplying the burner were in this way equalized; and the result was that, with a good burner, the flame burnt with a perfectly even top, so that it could be measured, up to 2·8 inches, to within a tenth of an inch. This little apparatus, Mr. Young incidentally remarked, could be obtained of Messrs. W. Sugg and Co. He found that a 2½-inch flame was the most promising for his purpose; and a modified Evans photometer, in which the disc was stationary, was employed—strict cleanliness with regard to the candles being observed. With the view of ascertaining the value in candles of the 2½-inch flame, he tested it against candles selected as fulfilling as nearly as possible his requirements of what candles should be, so as to give an amount of light proportionate to the sperm consumed; but they were not interfered with in any way before or during the experiments. Twenty-five different candles were tried; the highest result being 14·34, and the lowest 13·9 candles. These results gave a mean value of 14·18 candles to the 2½-inch flame; and they showed conclusively that candles could be obtained that would give uniform results, and, further, that a 2½-inch flame of common coal gas in a "London" Argand produced the same amount of light no matter whether the quality of the gas was 15·5 or 17 candles. Mr. Young here mentioned that he had tested 2½-inch flames of Pintsch's oil gas of 38 and 40 candle power, and of carburetted coal gas of 18 and 20 candle power respectively, and obtained the same results; but with Steenbergh's carburetted water and coal gas enriched by petroleum, instead of cannel coal as in Mr. Good's process, the results were much higher.

The author next employed candles without having regard to the condition or the shape of the wick. Three candles were cut in halves, and burnt in the usual way. Directly the wicks glowed, the test was commenced; and as soon as it was completed they were extinguished by blowing out. Four tests were taken with each candle; at least an hour's interval being allowed between any two tests with the same candle. The results with No. 1 candle were: 15·84; 15·08; 14·51; and 14·35 candles. With No. 2: 15·03; 14·87; 14·29; and 14·25 candles. With No. 3: 16·32; 15·76; 14·8; and 14·36 candles. These figures showed a variation in candle No. 1, of 1·49; in No. 2, of 0·78; and in No. 3, of 1·96 candles in the value given to the gas-flame. The author called attention to the fact that the result diminished as the candle burned away, until, at the fourth test taken with them, it approached to the mean value given to the gas-flame by the experiments previously alluded to. In order to ascertain whether or not, after the third test with the candle, the results continued uniform, three candles were taken and used in the same way as the others; but the tests were continued until the whole candle was consumed. It was found that with care eight tests could be obtained from one candle. From the results of the experiments, the author quoted the following: (1) Highest, 15·9; lowest, 14·01; and mean 14·65 candles. (2) Highest, 15·68; lowest, 14·97; and mean, 14·72 candles. (3) Highest, 15·03; lowest, 13·94; and mean, 14·38 candles. Exactly the same result was shown as in the last experiments—viz., that the first four tests were much higher than the others; and that, when the real value of the gas-flame was approached, the results did not afterwards vary greatly. An examination of the wicks of these several candles revealed the cause of the excessive results given in the earlier tests, as in every case they were rough either with deposited carbon or loose fibres or both; and the worse they were in this respect, the higher the result obtained. By carefully trimming the wicks before use, and gently bending the wick down until the top was within ⅜ inch from the candle, the candles were brought into a condition similar to that in which they were found after being used several times.

Some experiments were next described with wicks carefully trimmed and regulated. Six candles were taken of the same make as those previously used (Miller's candles, with wicks containing 23 threads in each strand), and eight tests, or as many as possible, obtained with each; the highest, lowest, and mean results being: Candle No. 1: Highest, 14·3; lowest, 13·94; and mean, 14·11 candles. No. 2: Highest, 14·22; lowest, 13·9; and mean, 14·1 candles. No. 3: Highest, 14·64; lowest, 13·88; and mean, 14·17 candles. No. 4: Highest, 14·6; lowest, 13·92; and mean, 14·10 candles. No. 5: Highest, 14·35; lowest, 13·9; and mean 14·15 candles. No. 6: Highest, 14·54; lowest, 13·86; and mean, 14·06 candles. It will be observed, said Mr. Young, that these figures were much closer than in the former experiments, and that the enormous variations disappeared. He thought it worthy of especial notice that the mean result obtained with each candle was practically the same; showing that, at any rate with this particular make of candle, really uniform results might be obtained when the precautions he had indicated had been observed. In order to ascertain whether other varieties of candle would give similar results, he obtained samples of the candles used for the official testings at various provincial gas-works, and tested them against a 2½-inch gas-flame, having previously prepared and regulated the wicks. The experiments were made with wicks containing two strands of 22 threads and one of 23; with wicks containing 21 threads in each strand; with wicks containing two strands of 23 threads and one of 22; with wicks containing 18 threads in each strand; with wicks containing 21 threads in each strand; and with wicks containing two strands of 21 threads and one of 22. A large number of figures showing the results obtained were given by the author; and they proved that the results were practically the same with each variety—the mean results being remarkably close to the mean value given to the gas-flame. He specially pointed out that the candle with the least number of threads in its wick burned the largest quantity of sperm, which was the reverse of what he had expected. This, no doubt, was caused by these wicks being more loosely plaited than in the others. Comparing the results obtained with the sperm burned, experiments showed very clearly that the quantity consumed had little or no effect upon the result; or, in other words, that the light given by the candles was proportionate to the sperm burned within the range shown. The highest consumption of sperm was 45·4 grains, and the lowest 36·3; the values given to the gas flame being 14·24 and 14 candles respectively. In considering the bearing these results had upon the methods at present in use at the Metropolitan testing-stations with regard to the candles, Mr. Young said that up to April, 1889, the Gas Referees permitted the Examiners to use the same candles for the three daily tests, the average of which represented the illuminating power of the gas for the day; but since that date, they had ordered that different candles should be used for each test. The effect of this was, he said, that two Examiners testing the same gas might obtain totally different results; for if one worked with three fresh candles, he would report the gas as 1½-candle power higher than another who employed candles which had already been used several times. Under the old regulations, a better average of the candle was possible; and, as a consequence, disputes were less frequent.

The next experiments of the author were made in accordance with the suggestions in the letter to the JOURNAL previously referred to; and the wicks were further assisted to burn into proper condition by gently bending them downwards when necessary, and removing all loose fibres. The candles were all of the same make as those recorded in the first four sets of experiments. Six tests were made with each candle; this being as many as could be conveniently obtained; and at least an hour's interval elapsed between any two tests with the same candle. The highest, lowest, and mean results were as follows: Candle No. 1: Highest, 14·35 candles; lowest, 13·94; and mean, 14·2 candles—the consumption of sperm varying from 43·7 to 40·3 grains in ten minutes. No. 2: Highest 14·38; lowest, 13·94; and mean, 14·14 candles—the consumption of sperm varying from 41·7 to 39·1 grains. No. 3: Highest, 14·47; lowest, 14·02; and mean, 14·25 candles—the consumption of sperm varying from 41 to 38·3 grains. No. 4: Highest, 14·26; lowest, 13·98; and mean 14·1 candles—the consumption of sperm varying from 41 to 39·2 grains. No. 5: Highest, 14·08; lowest, 13·94; and mean, 14 candles—the consumption of sperm varying from 41·9 to 40·3 grains. No. 6: Highest, 14·48; lowest 13·91; and mean, 14·24 candles—the consumption of sperm varying from 43·6 to 40·8 grains. The means of these tests were equally uniform with those in the previous ones; and they showed that the number of tests necessary to ensure a reliable result might be reduced to six. If this method were adopted at the public gas-testing stations, it would double the work of the Examiners; but the results of the experiments, the author thought, showed that an average

of three tests by his method gave equally satisfactory results. The tests as regarded the position of the wicks in relation to each other, and the interval elapsing between each test, were all taken in strict accordance with the Gas Referees' latest notification; and assuming that they were the official tests for the several days, the results he said would be recorded as follows: First day, 14·23 candles; second, 14·19; third, 14·15; fourth, 14·34; fifth, 14·10; sixth, 14·20; seventh, 14·13; eight, 14·12; ninth, 14·07; tenth, 14·24; eleventh, 14·01; twelfth, 14·12 (mean of two tests). These figures showed a maximum variation of only one-third of a candle in the illuminating power of the gas-flame in twelve days' work. It might reasonably be supposed that the 2½-inch gas-flame employed varied slightly in illuminating power from time to time; but even if it was assumed to have been absolutely invariable, and the whole of the difference in the results attributed to the candles, these experiments proved that sperm candles would give very satisfactoryresults.

The outcome of these experiments led the author to suggest that the candles should always before use be brought into a uniform condition as regarded shape and state of the wick. The shape he adopted was that which they naturally assumed in the majority of cases after the candles had been burnt and extinguished three or four times. This shape was generally retained as long as the candles lasted, if they were only burnt long enough for the tops of the wicks to glow before commencing a test, which was from ten to fifteen minutes, and were extinguished immediately the test was completed.

In all the experiments with 2½-inch flames, only two different, chimneys were used; they were of the same colour, thickness, and dimensions, and invariably placed in the same position on the burner, so as to present the same face to the disc in each experiment. In Mr. Young's official tests, a different chimney was always used for each; and it occurred to him that the discrepancies might be due to the chimney. His stock of chimneys were all of a smoky brown colour. They varied very much in thickness and in internal diameter; and not one was perfectly cylindrical. The results of some experiments with thick and thin chimneys, varying in thickness from $\frac{1}{8}$ to $\frac{1}{50}$ of an inch, were quoted by the author, who mentioned that special care was taken with the candles. The results, given in the order in which they were recorded, were as follows: With thick glass 15·53 candles, thin 15·93; thick 15·94, thin 16·68; thick 15·48, thin 16·28; thick 15·85, thin 16·53; thick 16·09, thin 16·65; thick 16·08, thin 16·50; thick 16·77, thin 17·48; thick 15·43, thin 16·36; thick 15·98, thin 16·36; thick 16·06, thin 16·63; thin 16·83, thick 16·34; thin 16·68, thick 16·17; thin 16·55, thick 16·10. These figures showed that the thickness of the glass had a considerable effect on the illuminating power. In order to see if the colour of the glass had anything to do with it, comparative tests with thick and thin brown glass and thick very pale amethyst glass chimneys were also made. The amethyst chimney was thicker than the thickest brown one, and was more cylindrical. The results were as follows: Thin brown 16·48, thick amethyst 16·24; thick brown 15·23, thick amethyst 16·0; thick brown 15·85, thick amethyst 16·42; thick brown 16·02, thick amethyst 16·79; thick brown 15·68, thick amethyst 15·90, thin brown 16·12; thick amethyst 16·24, thick brown 15·65, thin brown 16·47. The colour and thickness of the glass, these experiments showed, were very important when accurate work was to be done. The dimensions and shape of the chimney were, the author maintained, of great importance, and the subject, he said, should not be left in its present uncertain state. It seemed to him that the internal measurement of the chimneys was the proper one to take; but Mr. Sugg contended that it should be the external.

The next portion of the paper was devoted to some details of tests for 18 days made by Mr. Young, officially at the Jewry Street (City) testing-station; the results of the tests being recorded in the order of the heights of the flames. The figures appeared to indicate that variations in the results were not due to the candles, but attributable to the difficulty of exactly measuring the flames. The figures also showed that, with the shortest flame (2·9 inch), the results were most uniform; but with the longest (3·1 inch) the least uniform.

The author said he thought that he had shown conclusively (1) That standard sperm candles might be relied on to give fairly uniform results if due regard was paid to the condition as well as shape of the wicks before commencing an experiment. (2) That the light candles gave was practically proportionate to the sperm burnt, far outside the limits fixed by the Gas Referees. (3) That the glass chimneys used with the test burners should be uniform in colour and thickness in order to obtain accurate results.

In concluding his paper, Mr. Young mentioned some experiments made with Harcourt's 16-candle standard. He reminded those present that, in the early part of the paper, he stated he had found that 2½-inch flames of coal gas, carburetted coal gas (*i.e.*, coal gas passed through cold petroleum spirit as in Lowe's carburettor, or hot as in Maxim's), and of Pintsch's oil gas, all possessed the same lighting power; but that a similar length of flame of Steenbergh's carburetted water gas, or of coal gas enriched with petroleum oil, instead of cannel coal, as in Good's patent, gave much higher results, as experiments showed that with Steenbergh's gas the 2½-inch flame equalled 18 candles, and that gas obtained by Good's method equalled only 15 candles. In view of the fact that carburetted water gas was now being made and supplied in England, either alone or mixed with coal gas, it was important to know whether standards of light such as the one under notice were effected by the substitution of such gas for common coal gas. Harcourt's 16-candle standard consisted of a "London" Argand burner over which a screen was fixed at a definite height above the top of the burner. The gas was turned on at the rate of 4·5 cubic feet per hour; and sufficient of the gas was then passed through a carburettor containing pentane to produce a flame about 3 inches in length, or until the tips of the flame were seen in a peep-hole pierced in the screen. Mr. Young mentioned that by the kindness of Mr. Heisch, who lent him the Harcourt standard, and of Professor Lewes, who placed at his disposal the gas and photometer at Steenbergh's carburetted water gas works, at Knightsbridge, he was enabled to test the standard when burning carburetted water gas. The apparatus was set up in the photometer in place of the test-burner, and tested against candles. The gas used was of a value of 18·2 candles; and tests were taken with the following result: (1) 17·58, (2) 17·80, instead of 16 candles. Therefore gas of this character, when tested by candles would be returned of only 16-candle power; and it was evident from the results of this experiment that these would be unsuitable for testing carburetted water gas. For a mixture of coal gas and Meeze's water gas, he had on several occasions found that a jet photometer indicated 16 candles, when the quality had really been a little above 18 candles. He had no doubt this would be the case in all other standards of light, such as Methven and Sugg's 10-candle standard.

In the course of the discussion,

Mr. W. J. Dibdin said Mr. Young had shown it was possible, by means of sperm candles, to obtain constant results; and, in doing this, he (Mr. Dibdin) thought he had performed very good work. He himself had been able to obtain similar results on other occasions; but the great difficulty with him was not what he could make the candles do if he was allowed to use his discretion, but what candles would do in his hands if he was tied down by the red-tape of Parliament and the instructions of authorities, who gave those instructions in the utmost good faith, but yet were limited to the terms of the Acts of Parliament. If the photometrist were allowed to use his own common-sense, he probably would get better results. But then the question would arise, as to the proper way to make the test? It seemed to be a question of two ends of a piece of elastic; and they had to fight out the question which was the fixed, and which the moving one. To his mind this summed up the candle controversy—that they could work candles infinitely better than they were obliged to work them by the Act. The fact, was they must get an alteration of the Act, to bring about some more definite instructions than they had at present. Would it not, in fact be better to at once get a new Act of Parliament which would describe a definite and invariable standard, which could be only worked in one way, so as not to be able to produce two results. Another point was this—Mr. Young had told them that a 2½-inch flame in a standard Argand burner gave a light of about 14·2 candles. They had heard a good deal of 2½-inch flames being over 16 or 17½ candles—at least he had. The question arose, was Mr. Young's figure of 14·2 or the 16 or 17½ candles the correct one? He was rather sorry that a few comparisons between candles used in this method and one of the recognized proposed substitutes for candles were not given in the paper. Mr. Young had not given them any evidence that his method of using candles was correct. He also hoped that he would take an opportunity of satisfying himself that his figure was the right one; or if it was not, that he would ascertain what was the correct one, for everything bore upon that. It was a question of relative value, whether the 14·2 candles was correct, or should it be something higher. While listening to the paper he had been reminded of the German practice in regard to the standard candles. They did not use sperm candles, but paraffin candles. A Commission was appointed to inquire into this question; and it was decided that it would be best to have the paraffin candles manufactured under their own immediate supervision, and sent out in sealed packets. They could always be recognized by the wicks having one red thread in them. But they were not satisfied with this. They went further, and measured the height of the flame; and if they were not pleased with the general character of it, they snuffed the wick. In England, it would be held to be the very last thing that the operator ought to do to interfere with the wicks, so as to get results that he would not obtain naturally. He was reminded of the German experience by hearing Mr. Young's account of how he thought it desirable virtually to snuff his wicks by burning them and blowing them out, and repeating the operation two or three times, and taking care that the wick was not too much elevated or bent down, but was at what was generally known as the normal curve with a glowing top; and then conditions obtained under which they realized satisfactory results. He should perhaps say something with regard to the 16-candle standard introduced by Mr. Vernon Harcourt. Mr. Young had shown that, when they tested some of the gases which were proposed to be supplied in London, the standard was no longer reliable. This was a valuable and interesting point. He should like Mr. Young, however, to try the initial pentane Argand which he (Mr. Dibdin) had described to the Society, in which the standard combustible was absolutely separate from the gas they were going to test. He took a rough-and-ready form of Mr. Harcourt's pentane flame.

An Argand was specially constructed to burn atmospheric air charged with vapour of pentane; so that, by using atmospheric air, he did away with all uncertainty as to the quality of coal gas, and it was perfectly reliable and portable, whether they had coal gas or not. He had never put it forward in preference to the one-candle pentane Argand; but he thought if Mr. Young was to try this practical working standard, he would find that, by using atmospheric air and pentane, he would have no difficulty, and if he kept the carburetter properly charged with pentane, he would obtain different results.

Mr. YOUNG, in reply to a question by Mr. W. Foster, said that the burner he used in his experiments was an ordinary test burner with a gauze curtain round it. It was only employed to produce a 2½-inch flame against which to test the candles; and it was not used for any particular gas. It was a cylindrical piece of gauze fitted round the outer portion of the burner, and resting on the photometer.

Mr. FOSTER said that it naturally seemed to him in introducing such a system as that, they were going on the lines of the late Sir William Siemens's burner—they would have a heating medium; and it would be practically a small recuperative burner. To warm the air supply by any means modified considerably the amount of light which any particular flame would give. He was glad Mr. Young had brought this question forward as to the character of gas-flames when nitrogen and inert gas was present. It was one which he was certain would, sooner or later, be thoroughly looked into. In testing gas impartially and satisfactorily, they had two parties to deal with—the maker and the consumer; and the Gas Examiner should hold an even balance between them. He had always felt that whatever had been proposed by Mr. Harcourt or others had had the serious defect that one of the essentials had been the thing which was to be tested—that was to say, if coal gas was to be tested in any way, that, to the legal mind, would be an inherent defect. One point which had occurred to him in regard to the burning of the candles, was that where they had a wick which was not perfectly straight, it seemed to him that there they had a character of flame which could not possibly be the same physically as one which was a perfect cylinder. The external area of such a flame must be greater, and there must therefore be a different character of combustion for each unit of sperm burned. He had often wondered how it was that no one had ever attempted to construct a candle with an incombustible wick. Anyone who made such a candle would no doubt have nothing but a flood of criticism expended upon it; but it would be worth while to construct such a thing. The material might be a paraffin of specified melting point; and the wick might be made of asbestos threads or glass, with a spring arrangement for pushing it up, as in the ordinary lamps used by cab-drivers. Concluding his remarks, he said that seeing that candles could be purchased and used without much preparation, their term of life appeared likely to be further prolonged by the results of the experiments Mr. Young had made.

Mr. SULLIVAN asked Mr. Young whether he had experimented with oils of heavy specific gravity; whether he had experimented with oils of different qualities; and whether he had made any experiments with different oil vapours. If not, he thought it was a matter that was well worth experimenting upon, as there was no doubt that, in the course of a few months, London would be receiving some millions of cubic feet of water gas.

Mr. MORRISON said that he had had some little experience in the testing of Glasgow gas; and he could say, from personal experience, that the form the wick assumed was of very great importance. He had had no experience in testing English gas; and he should like to know whether the Argand burner used had a specified number of apertures, and whether the apertures were of any particular diameter. This, to his mind, was a point of considerable importance.

Dr. S. RIDEAL said that before the paper was announced, he was under the impression that the subject of the standard candle had been settled; and that the question would not have been again raised at a meeting of any scientific society. He thought that Mr. Young's paper and the remarks of subsequent speakers showed that there was no such thing as a normal standard candle. It might be said that the genus of sperm candles included a great variety of species, and the different species were subject to give rise to different varieties. The question had not been raised as to the nature of the photometer having a great influence on the results which were obtained by the candles—that was, whether they were used in enclosed photometers or in an open box. There was also the question as to the influence of the rate of flow of air on to the candle, and whether or not the air had been heated. He thought the sooner an Act of Parliament was introduced dealing with this subject, or a commission of experts appointed to devise a new standard, the better.

Dr. WRIGHT said there was a point about which he should like to elicit a little information, and that was, What was meant by a sperm candle from a chemical point of view? He presumed the candles were made of a material of a particular melting-point; but that did not necessarily mean that they had a certain definite chemical composition. He had a very strong impression in his mind that little differences in the composition would have a very material effect by, possibly, influencing the rate at which the material burnt, and probably, even if the rate of burning were the same, in influencing the amount of light given out. He should like to ask Mr. Young whether the candles tried by him were examined from a chemical point of view, as well as the physical light-giving point.

Mr. LACEY said that one point Mr. Dibdin raised was as to what was a normal candle. He thought it was clear a candle was normal when it was not disturbed. They should not be snuffed; but burned from the beginning to the end, and taken with all their discrepancies. The reason they had so many discrepancies was that the candle, as it was now burned, was a very variable standard. If they took an average of a hundred or a thousand tests, they would get near the truth; but they only took a small number, and then obtained many variations. It was only what one might expect, that they should occasionally get results that were rather astounding. As far as Mr. Young's researches went, they were certainly very interesting to most of them; but it was astonishing that so much accordance could possibly be obtained with a standard which they knew, when used in the ordinary way, was so variable. He thought the figures proved conclusively that the candles, when treated in the way Mr. Young had dealt with them, could be used as a standard. The tables in the paper showed that when the candle was first lighted, it gave high results, then it gave lower results, and by and by it became normal—that was to say, the rate of light it gave nearly approached the average light; and these high extremes at first had evidently been taken into the general average. These high results belonged to the candle; and they could not reject them simply because they were different from the others—they certainly should be taken in the general average of the candle. That a candle burned very regularly after it had been alight a certain time, appeared to be proved from Mr. Young's tests. In the course of further remarks, Mr. Lacey referred to the use of the gauze curtain round the flame; and said that the alteration of the air supply would make a great difference in the shape of the flame, and so affect the light from it.

Mr. JOHNSON said he should like to ask Mr. Dibdin a question with reference to the pentane standard. It was very important in view of the remarks that had been made by Dr. Wright that a body of an absolutely fixed chemical constitution should be used as a standard of light. In view of this, the pentane standard had certainly the advantage of the spermaceti standard. But the pentane standard would not depend for its accuracy so much on the fixed composition of the pentane as on other matters. There was the question of the temperature of the air. The tension of vapour of pentane would vary, like all other volatile liquids, with the temperature; and he wished to ask Mr. Dibdin if that factor had been taken into consideration. [Mr. DIBDIN: Yes; very carefully.] It would vary also with the state of the barometer, and also with the amount of moisture in the atmosphere.

Mr. YOUNG, in replying upon the discussion, said that Mr. Dibdin seemed to consider that the law referring to the testing of gas should be altered. He (Mr. Young), however, did not think this would be necessary if his suggestions were carried out. The law provided for certain instructions being given by the Gas Referees as to the mode in which the testing should be performed; and they had ordered that the candles should be used in a particular manner. But there was not the least reason why they should not go a little farther, and add another condition to the testing. Mr. Dibdin also mentioned that gas companies expected the Examiners to use candles so as to get high and not low results, which could be done if the candles were not burning in a proper manner. His (the speaker's) experience was that, if the Examiners did their work fairly and impartially, they made no objection. Then Mr. Dibdin raised the question of the value of the parliamentary candle. The average of the tests in his third set of experiments showed the value of the candles; and these were the candles supplied to the gas-testing stations for use. The average of the tests showed that the flame in No. 1 was 14·65 candles; in No. 2, 14·72; in No. 3, 14·38—that was taking the whole candle from beginning to end, and using it as much as was possible in the circumstances under which the Examiners had to work. This showed that the difference between the whole of the candle, and the candle as he (Mr. Young) had proposed to use it, amounted to roughly half a candle in the value of the flame. At the same time the gas companies were liable, under the existing law, to have tests taken with a candle that had been used several times, and then it came into a condition in which it ought always to be, and would be in if the wick was in a perfect condition. When a candle was cut, the ends were in a rough state, and the flame would not give the full illuminating power; but as soon as the wick got into a proper condition, a good flame and regular tests were obtained. If the gas companies thought over this matter, he did not think they would seriously object to his suggestions. As to blowing out the candles three times, this was done with every candle. A candle was never lighted and burnt right out; but the Gas Referees required that a different candle should be used for each of the tests in one day's work. So that a candle might be lighted up and blown out perhaps six or seven times. In short, what he objected to was taking the test the first two or three times the candle was lighted, as the tests were not correct, and should be rejected. Now Mr. Dibdin's standard he had no doubt would, in the hands of a careful workman, give constant results. His own experiments with a 2½-inch flame, he thought, proved that

—given the possiblity of carefully measuring the flame to start with, and properly constructed apparatus—the light coming under the screen would be of constant value. But there came the difficulty, they must have a standard that could be taken all over the country and not one that would be used solely in the elaborately fitted Metropolitan gas testing-stations. Mr. Foster appeared to think that he was proposing the use of a gauze curtain; but he made no suggestion of the kind in the paper. The gauze curtain was only employed for the purpose of these experiments. He found that a 2½-inch flame was equal to a little over 14 candles; and a large number of experiments showed that, using a gauze curtain made no difference—when it was removed there was not a difference of 2-10ths in the results. Another point that had been mentioned, but he did not think had been made enough of, was the dimensions of the standard test-burner. The Gas Referees in their notification went into minute details as to the dimensions of the burner; but they had not provided means of ascertaining whether those dimensions were correct or not. They used these burners; but they never tested them, and one important portion of the burner could not possibly be tested.

Mr. DIBDIN (interrupting) observed that to his knowledge all the standards used in the Metropolitan districts were carefully measured at the Board of Trade Standards Department.

Mr. YOUNG said he did not know that. Nevertheless the burners remained in use at the testing places for eight years without any changes. Was it reasonable to suppose that, after eight years' use, the burner was in the same condition as when it was new? Whose duty was it to see that the burner remained of the proper dimensions?

Mr. DIBDIN said that as far as the County Council district was concerned, it was his duty to test the burners with a standard burner in his possession; and he had never known of any defect in the illuminating power from the burner being in use for any length of time.

Mr. YOUNG (continuing) said, in answer to Mr. Sullivan, that Pintsch's was the only oil gas he had ever tested. He had also tested coal gas that was enriched by light oils, and also water gas that was carburetted by light and heavy oils. The difference between the luminosity of the flames was very distinct. Pintsch's oil gas, and coal gas enriched by light hydrocarbons gave the same illuminating power with a 2½-inch flame as the coal gas alone. The rate of the consumption of gas was very much less; but in the case of water gas enriched by hydrocarbons, the illuminating power of the 2½-inch flame went up to 18 candles. The illuminating power of gas that was enriched by hydrocarbons (by petroleum, instead of cannel, as in Good's process) was increased from 14 up to 15 candles. Dr. Rideal seemed to be of opinion that all this testing work should be highly scientific. If he had had the experience he (Mr. Young) had had in going about the country, he would see it was really a matter of commercial valuing rather than scientific experiment. They wanted some reliable means of testing gas which was not too scientific for the average gas manager to comprehend and use himself, and that they had in the case of candles. In answer to Dr. Wright, he said he had not made an analysis of the sperm in the candles he used; he had no idea what the composition was.

The CHAIRMAN, on behalf of the members, thanked Mr. Young for his paper.

Mr. R. Little has been appointed by the Alnwick Rural Sanitary Authority Clerk of Works for the Alnmouth water scheme. There were a large number of applicants for the position.

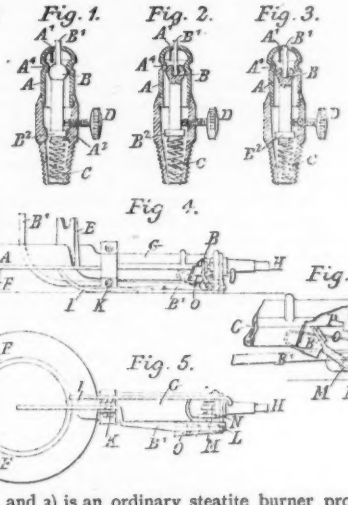
European Gas Company.—The Directors of this Company have appointed Mr. John Blacket Gill (Chairman of the Commercial Gas Company) to the seat at the Board vacated by the recent decease of Mr. Henry John Baddeley.

Death of Mr. R. Rice.—We regret to have to record the death of Mr. Robert Rice, of "Broadwater," Addiscombe Road, Croydon, which occurred suddenly at his residence on the 29th ult., from syncope. Mr. Rice was a Director of the Mitcham and Wimbledon and West Kent Gas Companies from their incorporation in 1867; and had for many years been Vice-Chairman of both undertakings. He was also a Director of the Singapore Gas Company. The deceased gentleman was a striking example of the success which is possible in this country to an ordinary painstaking, persevering man of business. At quite an early date, he became a firm believer in the gas industry; and he not only invested in it largely himself, but induced his friends to follow his example. Having acquired an interest in this great enterprise, he personally supervised the operations of the Companies with which he was connected. He was always at his post; and it is questionable if he was more than once absent from their Board meetings. He was candid and outspoken—having an opinion of his own on every subject brought under his notice; yet withal extremely genial and thoroughly reliable. His death is much regretted by the Directors and officials of those Companies. Mr. Rice was a native of Pulborough, in Sussex, where, in his 77th year, he was laid to rest, in accordance with his expressed wish, on the 4th inst., in the presence of a numerous attendance of relatives and former colleagues. He leaves a son (Mr. Robert Garroway Rice, F.S.A., Barrister-at-Law) and three daughters.

REGISTER OF PATENTS.

Gas-Burners.—Lavender, G. L., of Walsall. No. 2198; Feb. 11, 1890. [8d.]

This invention relates to the regulation of atmospheric and other burners when used for intermittent heating purposes.



A (figs. 1, 2, and 3) is an ordinary steatite burner provided with a slit A^1 (for the passage of the gas or gas and air to form the flame) at one side, so as not to interfere with the operation of the valve. B is the valve; and B^1 a spindle or end projecting through the top of the burner. C is a spring contained in the lower part of the burner; and D, a set-screw for fixing the valve if required. B^2 is a collar fitting in a diminished portion A^2 of the burner, in which, however, are provided small passages A^3 to allow of the constant passage of gas past the collar B^2.

The operation of this device is as follows: When the burner is not required for use, the valve B closes up against the restricted portion A^4 of the burner, so as to nearly prevent the passage of gas—enough only being allowed to escape to maintain a small flame upon the burner. When the burner is required for use, the pot or other article is placed above it, and rests upon the spindle B^1—thus forcing it in (as shown in fig. 3); the chief weight of the body being supported, if required, upon any suitable framework. With the valve in the position of fig. 3, free passage of the gas is allowed past the valve B; and the full flame is obtained so long as the spindle B^1 is kept in and the valve B open. When, however, the vessel is removed, the spring C bearing at one end in the bottom of the burner, and at the other against the collar B^2, forces up the collar, and with it the valve B; thus closing it, so far as it is ever intended to be closed. By means of the set-screw D, the valve may be retained permanently opened (or permanently closed) as required, by screwing it against the valve-stem.

In the form shown in figs. 2 and 3, the spindle B^1 (instead of being a fixture upon B) is loose in it; and it is retained therein by a head, over which a portion of the valve B is so far closed that, while allowing movement to the spindle B^1, it cannot fall out. The reduced portion of the burner A^2 of fig. 1 is dispensed with; but otherwise the construction is the same as in fig. 1. The difference in operation is simply that, whereas in fig. 1 the set-screw D, when screwed up, is resisted by the valve-stem (on account of the latter being supported by the collar B^2, the reduced burner portion A^2, and the fixed spindle B^1), in figs. 2 and 3 the valve is not supported in this manner, and the set-screw, when screwed in, forces the whole stem to the opposite side of the burner until the collar B^2 touches the shell of the burner; the spindle B^1 accommodating this change of position by turning in its socket.

The object to be attained by figs. 4 to 6 is the same as that already described; the mechanism being altered to suit the different shape and arrangement of burner to which it is applied. A represents the burner-ring, from which the gas or gas and air may escape through holes in the ordinary way. E are supports, upon which the vessel to be heated is carried; and F represents the legs supporting the burner. G is the pipe conveying the gas and air or gas, which latter would usually enter at the nozzle H through a flexible tube, to the burner. I is a little pipe or bye-pass, to provide a flame for lighting the main burner; it being preferable in atmospheric burners that the valve, when the weight is removed, should entirely cut off the passage of the gas. B is the valve, and B^1 the lever which operates it, and which in this burner takes the place of the spindle B^1 in the burner shown in fig. 1. The lever B^1 is pivoted at K; and at its inner end it is jointed to an arm L of the spindle M, which passes through a support or bracket N, and carries on its other end the valve B. O is a spring, one end of which is fixed to any suitable part of the apparatus; the other end bearing upon the lever B^1 in such a direction as to close the valve B.

The operation is as follows: When the vessel to be heated is placed on the burner, it rests upon supports E, depressing the end of the lever B_1, which normally lies above the level of the supports E, and which turning upon its pivot K raises its other end, and through the arm L turns the spindle M and valve B. When the vessel is removed, the lever end B^1 rises and lowers its other end so as to close the valve B, which now fits tightly over the end of the inlet-pipe P.

Gas Brackets and Chandeliers.—Badams, H. H., of Sutton Coldfield. No. 2912; Feb. 24, 1890. [8d.]

The patentee proposes to construct a chandelier with the arms or globe supports in the ordinary manner; but the burner is supported

by the arms from above instead of from below. The burner is specially arranged to suit this method of support, and the globe is also arranged to fit into clips or holders carried above, instead of beneath it. The escaping fumes are collected by a cup or funnel placed immediately above the burner; and from the cup or funnel there is lead off a tube, or pipe, to the top of or to any desired point upon the chandelier, to meet the similar tubes, led from the other burners, arranged upon the same chandelier,

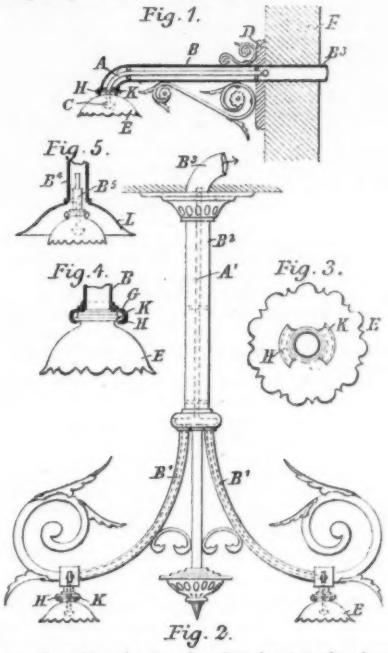


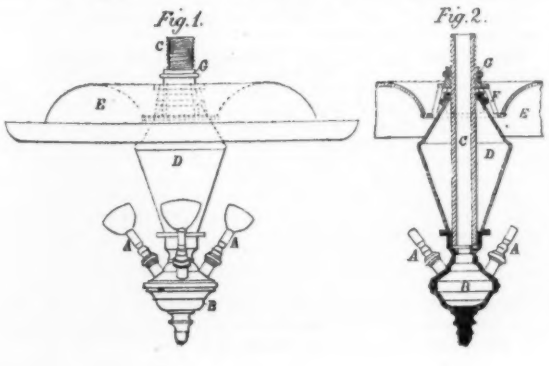
Fig. 1 is an elevation of a gas-bracket having the fume-collecting tube suitable for attachment to a wall or the side of a building or room. Fig. 2 is an elevation of a chandelier or central gas-bracket with the fume-collecting tube arranged upon each burner. Fig. 3 is a plan of the globe E and the globe attachment with the inner gas-tube omitted; and fig. 4 is an elevation of the same. Fig. 5 is an elevation of a bracket with an outside ventilating or collecting hood.

The gas-tube A is carried within the fume-tube B, the end of which is formed with an attaching collar or intercepted recessed ring clip arms H, for receiving the corresponding flanged arms K formed upon the globe rim. Above the projecting arms upon the globe rim is a joint face or ring for the purpose of receiving a washer or ring G of asbestos or other packing material for preventing the escape of the fumes. The gas-tube A is supported within the exhaust-air tube B by means of rings or collars having openings for permitting the air to readily pass along the tube, and so escape outside the wall F, or conveyed through the ceiling by means of the tube B_3.

The chandelier is made in the usual manner; but the double tube gas and exhaust pipes are applied to each burner—the gas being supplied by means of the central tube A^1 within the fume-collecting or ventilating tube B^2, and each burner being also connected to the central supply-pipe A^1 and exhaust-pipe B^2, by means of the usual connections. Sometimes an outside shield or hood L as shown in fig. 5 is attached to the fume-collecting pipe B^4; while the central fume-pipe B^5 is tapered or contracted for the purpose of inducing an air current, and thus aid in ventilating as well as lighting. Similarly when the gas is not lighted, the room is ventilated by the escape of the foul air through the hood L and its connection with the outlet-pipe B^4.

Reflector Lamp for Gas-Lights.—Shaw, J., of Huddersfield. No. 3490; March 5, 1890. [8d.]

This reflector lamp consists of a number of gas-burners arranged in a circle, but standing up at an angle of (say) 45°. Rising up from the centre of the burners is a cone-shaped part with its apex at the bottom; and projecting up from the base or broad part of the cone is another cone with its apex upwards. In combination with these double cones is a projecting cover or concave reflector, having an enamelled underside. This reflector (supported by suitable framework) has a hole formed in the centre of it, so that an annular space or aperture is

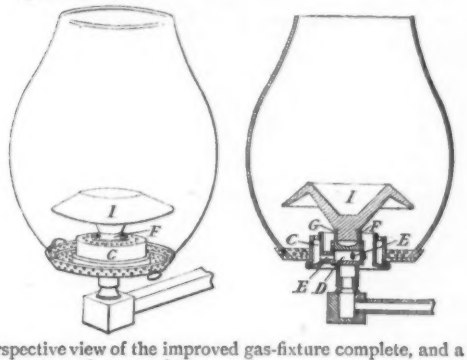


left between the apex of the upper cone and the opening in the centre of the reflector, in order to allow of the escape of the spent gases; and if need be the opening in the reflector may be connected with a ventilator for conducting away the spent gases.

Fig. 1 is a front elevation, and fig. 2 a vertical section of the reflector-lamp, comprising a number of gas-burners A secured to the globe or chamber B supplied with gas by a vertical pipe C. D represents a double cone kept in position by a cap or nut made to fit the upper screwed part of the vertical feed-pipe. In combination with these double cones is a projecting cover or concave reflector E, made with a central opening, the inner edges of which rest upon the flange of the bridge F. The upper end is tapped with screw-threads, so as to be adjustable up or down, for the purpose of increasing or diminishing the size of the annular opening left between the flange and the apex of the cone. G is a locknut, to fasten the bridge on the pipe C. The annular space referred to allows the escape of the spent gases; and, when required, it may be increased or diminished by raising or lowering the bridge F, as already described. This form of lamp is said to possess the advantages of the regenerative system without any complicated parts liable to derangement; and by utilizing the products of combustion (which gather underneath the reflector) for heating the gas and air to be burnt, an increased luminosity is given to the carbon contained in the gas.

Gas-Burner.—Horn, W. W.; communicated from A. G. Morey, of La Grange, Ill., U.S.A. No. 3726; March 8, 1890. [6d.]

This invention has relation to gas-fixtures wherein an Argand burner is employed in conjunction with a device for spreading the flame, "for the purpose of causing complete combustion of the gas as it escapes from the apertures in the burner."



A perspective view of the improved gas-fixture complete, and a vertical transverse section, are given.

On the arm or bracket of a gas-fixture of any desired construction, an Argand burner C is secured so as to feed the gas into an annular receptacle provided at its upper end with a series of small apertures, as usual in that class of burners. The central part of the burner consists of a cylindrical chamber D, from which the gas is fed to the burner proper through the branch-pipes E; and the chamber D is open at its upper end, and provided with an interior screw-thread to adapt it to receive a plug or cap F, the inner part of which forms a recess or socket G, arranged to receive the tenon of the flame-deflector or spreading device I. This consists of a circular disc supported upon an inverted cone, and having its outer rim deflected so as to overlap the burner. The sharp angle formed by the outer rim is placed directly over the openings in the burner, so that as the flame passes upwards, it strikes the deflector within this angle, and is thrown downward and outward; thereby causing the rays of light to be deflected downward and outward from the "spreader."

The spreader is by preference made of a composition consisting of a mixture of refined clay or terra-cotta, asbestos, and manganese, mixed in suitable proportions, and moulded into the proper shape. Not only is this material practically indestructible by heat, says the patentee, but after it is thoroughly heated, it becomes to a certain extent incandescent, and reflects its own light through the thin film of flame encircling it, "thus giving a peculiarly white and pure light, which cannot be attained by the substitution of other material."

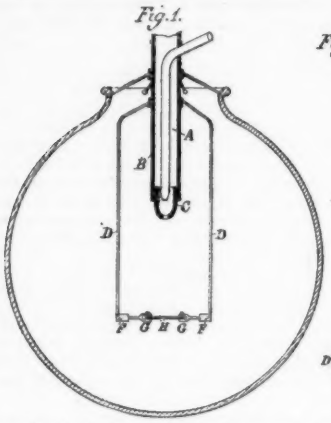
The body of the burner is provided at its lower part with an annular rim or flange forming a support for the foraminated chimney-holder. This latter is struck up from a single piece of perforated sheet metal, and is provided with an inner and outer upwardly-turned flange to fit closely around the lower rim of the globe or chimney.

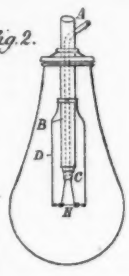
Incandescent Gas-Lamps.—Wenzel, A., of Czernowitz, Austria. No. 3767; March 10, 1890. [6d.]

In an incandescent gas-lamp made according to this invention, a stream of illuminating gas (into which air, or a combustible gas, or a gas capable of supporting combustion, is blown or drawn) is caused to issue from the burner tube, and to impinge against an incandescing body of suitable form, which, when brought to glow heat by the flame, emits a bright white light.

Fig. 1 illustrates in vertical section an arrangement of lamp according to this invention. Fig. 2 is an elevation illustrating another arrangement. Fig. 3 shows in plan a convenient mode of fixing the incandescing body represented in fig. 1.

A and B are tubes arranged one within the other; the inner tube projecting in the manner of a nozzle into the burner proper C. Through either of the tubes illuminating gas is passed; and through the other tube is passed oxygen, hydrogen, water gas, oxy-hydrogen gas, or air, either singly or mixed together. The mixture, composed of illuminating gas and the other gas or gaseous mixture employed, is ignited, and impinges against an incandescence body H, which is carried in a stirrup-shaped piece D, whereby it is brought to an intense white heat by the flame of the gaseous mixture. In the arrangement shown in fig. 1, the incandescence body is in the form of a disc held in clamps





G, the ends of which are situated in grooves in projections F attached to the free ends of the depending arms D.

The whole device is so connected to the gas-supply pipe as to leave apertures for the exit of the products of combustion. The disc or part H is made preferably of oxide of magnesium, placed in the state of powder in a press, and subjected to great pressure, so as to form it into bodies naving the desired shape.

When oxide of magnesium is employed, it must, previous to the pressing operation, be nitrated by means of nitric acid; then the magnesium nitrate thus produced is heated until decomposition commences; and after the nitrogen oxides have been driven off, it is poured in a molten condition on plates covered with paper. The paper covering is simply to prevent the molten mass from adhering to its backing or foundation. The discs thus produced are (when solidified) again heated, in order to thoroughly complete the decomposition, to drive off the last traces of nitrogen oxides, and to obtain pure oxide of magnesium. This second heating operation does not melt the mass, but causes it to harden. In this way incandescence bodies may be made from melted oxide of magnesium in the form of very hard, and durable plates or discs.

APPLICATIONS FOR LETTERS PATENT.

911.—PRESTWICH, J., and PRESTWICH, W. H., "An improved gas or oil stove." Jan. 19.

970.—WILLIAMS, H., "Improvements in gas motor and similar engines." Jan. 20.

971.—THWAITE, B. H., "Improvements in methods of generating heating and lighting gases from liquid and solid hydrocarbons, and in apparatus therefor." Jan. 20.

1029.—PAPINEAU, R. W., "Improvements relating to the manufacture and carburetting of gas, and to apparatus therefor." Jan. 20.

1083.—ROBINSON, H., "Improvements in gas or combustible vapour engines." Jan. 21.

1099.—GEOGHEGAN, S., and PURCELL, M. F., "Improved apparatus for the purification and deposition of solid particles from gaseous fumes." Jan. 21.

1175.—TOLLERTON, J., "Improved safety ventilating self-lighting gas and electric battens for lighting up theatres and other public buildings." Jan. 22.

1203.—JONES, F. J., "Improvements in the manufacture of sulphate of ammonia." Jan. 22.

1234.—BARBER, T. W., "Improvements in gas-engines." Jan. 23.

1265.—WOODWARD, J., "Improvements in machinery or arrangements for charging and drawing gas-retorts." Jan. 23.

1299.—WILLIAMS, H., "Improvements in gas-engines." Jan. 24.

1302.—HEPPENSTALL, L., "Improvements in gas taps or cocks." Jan. 24.

1341.—JAQUES, W. E., "Improvements in gas-fires." Jan. 24.

1371.—HOLMAN, S., "Improvements in or connected with gas-lamps." Jan. 24.

1405.—BROUGH, R., "Apparatus for automatically closing valves to prevent sudden and dangerous outrush of steam, water, or other fluid, air, or gas under pressure." Jan. 26.

1410.—WOODWARD, J., "Improvements in machinery or arrangements for charging and drawing gas-retorts." Jan. 26.

1447.—WEATHERHOGG, G. W., "Improvements in gas and hydrocarbon motor engines." Jan. 27.

1464.—THOMPSON, C., "Improvements in appliances connected with water-works and reservoirs." Jan. 27.

1560.—PRICE, J., "A gas hydraulic main with washer and automatic dip combined, to be fixed without arch pipes." Jan. 28.

1563.—CLAPHAM, T., "Improvements in the construction of condensers applicable for use in the manufacture of illuminating or other gases." Jan. 28.

1579.—ARMOUR, L. H., "Improvements in or connected with ovens, furnaces, or retorts used for the making of coke or charcoal, or for distilling or roasting carbonaceous matter, or otherwise subjecting carbonaceous matter to the action of heat." Jan. 28.

1689.—LANCHESTER, F. W., "Improvements in igniters for starting gas-engines." Jan. 30.

1694.—CLERK, D., "Improvements in starting gear for gas-engines." Jan. 30.

1695.—COWAN, W., "Improvements in prepayment gas-meters." Jan. 30.

1780.—CLERK, D., "Improvements in gas-engines." Jan. 31.

1810.—OAKMAN, R. N., jun., "Improvements relating to gas-furnaces." Jan. 31.

1822.—ALLIN, S. S., "Improvements in gas-burners of the Bunsen type." Jan. 31.

CORRESPONDENCE.

[We are not responsible for opinions expressed by correspondents.]

The Management of The Gaslight and Coke Company.

SIR,—In my anxiety not to take up too much time at the Chartered meeting, I missed two or three points.

In concluding my remarks about labour, I particularly wished to say that all antagonism is to be deprecated, and that everything possible should be done, by just and liberal treatment, to attach the men to their employers.

With regard to coals, I intended to say that, by being in such a hurry to make their contracts, the Directors paid 1s. 6d. per ton more than they need have done. They might thus have saved £150,000 in the year.

The Chartered only require 1d. per 1000 cubic feet more than the other Companies to pay dividend and interest; therefore, with proper working and judicious purchase of coals, their price of 2s. 9d. is quite sufficient to pay the dividend of 13 per cent., and still leave a small surplus.

The Governor said it was not legal to allow a discount to large consumers. I should like him to show any prohibition in the Acts of Parliament. At any rate, the practice is common all over the country; and it is just, if the discount is not too large, and does not exceed the difference in clerical and distribution expenses between large and small consumers. I advocated it because I have found it effective in removing a sense of injustice, and in preventing the use of the electric light.

My reference to the Engineers was simply to state that too much is left to Secretary and Accountant, and too little to the Engineers.

Why should all this be said? It is simply a "hard, dry matter of business." The opinion is general, whenever the Chartered Company is named, that it is badly managed; thereby injuring not merely itself, but, from its unique position, gas property all over the kingdom. I think the Directors should know this; and I have therefore taken the opportunity of telling them. Having performed this very unwelcome duty, the matter now rests with them and the shareholders.

Tunbridge Wells, Feb. 7, 1891. GEORGE LIVESEY.

Preventing Water in Gasholder and Purifier Lutes from Freezing.

SIR,—We notice in the last issue of the JOURNAL that Mr. Marshall, of Copenhagen, adverts to the difficulties that the managers of gas-works have experienced with their gasholders, owing to the freezing of water in the tanks and cups, during the recent very severe weather; and we have gratefully to acknowledge the manner in which he is good enough to describe approvingly our arrangements for the conveyance of steam for the purpose of preventing these troubles, and for which we beg to say we have secured Letters Patent in this country and abroad, including the United States and Canada.

Mr. Marshall is quite correct in supposing that the heater and circulator used by us is constructed on the well-known injector principle. But it is especially made so as to be well adapted for the particular duty it is required to perform; and we think if the results we obtain are contrasted with those Mr. Marshall describes, it will be seen that the device indicated by his sketch is not the most efficient possible. Instead of four such injectors being required in the cups of a gas-holder 100 feet in diameter, we find that one to our pattern is ample to protect such a cup. For instance, one has sufficed during the past cold weather for a holder 154 feet diameter at Hanover, though there the temperature has fallen as low as 7° below zero Fahr

We may mention that the apparatus, fitted up as we supply it, has been doing excellent work on several other large gasholders during the recent severe weather.

Millwall, E., Feb. 6, 1891. S. CUTLER & SONS.

Messrs. Unsworth and Richmond, Limited, announce that, in consequence of stress of business, they have been compelled to move from their old works in Scotland Road into large and well-appointed works in Academy Street, Warrington. These works cover upwards of 3500 square yards, and comprise a large three-storey building, several long fitting-sheds, two engines and boilers, and fine offices and show-rooms. In addition, a capacious foundry is also now being erected, and will be completed this month.

Serious Illness of Mr. J. T. Browning, of Plymouth.—The following appeared in the *Western Morning News* last Wednesday: "Many of our Plymouth readers will regret to learn that Mr. J. T. Browning, C.E., of the Wilderness, Mannamead, is now suffering from a severe and most distressing illness, and is in a critical condition. Mr. Browning earned the gratitude of Plymothians by his services for 34 years as Engineer and Manager of the Plymouth Gas Company; and during that period his sagacious and economical engineering work contributed largely to the exceptional prosperity of the Company, resulting in the price of gas being at Plymouth as low as, if not lower than, that of any place in the kingdom."

Gas, Water, and General Investment Trust, Limited.—In the JOURNAL last week we briefly mentioned the dividend recommended by the Directors of the above Company. According to their report, which will be presented at the meeting of shareholders next Friday, the result of the working in the year ending Jan. 28 last is a balance of £20,132 14s. 6d., the whole of which has been added to the reserve fund; thereby raising it to £50,642 12s. 11d. After debiting the revenue account with all expenses, there remains a balance of £29,928 (being the actual receipts only), out of which interim dividends at the rates of 4½ and 5 per cent. per annum on the preferred and deferred stocks respectively, amounting to £11,456 5s., were paid in August last. The Directors now propose to pay further dividends at the rate of 4½ per cent. per annum on the preferred stock, and at the rate of 10 per cent. per annum on the deferred stock for the half year just ended; making for the year 4½ per cent. on the preferred, and 7½ per cent. on the deferred stock. This will absorb £27,787 10s.; leaving a balance of £2539 19s. 10d. to be carried forward.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following progress was made with Private Bills during the past week :—

Bills presented, read the first time, and referred to the Examiners: Brentford Gas Bill; Bristol Gas Bill; Bude Harbour and Canal (Abandonment) Bill; Filey Water and Gas Bill; Gaslight and Coke Company Bill; Kettering Gas Bill; Lynton Water Bill; Partick, Hillhead, and Maryhill Gas Bill.

Bills presented and read the first and second times: Alloa Water Bill; Dundee Water Bill; Glasgow Boundaries Bill; Llanelly Local Board Water Bill; Malvern Water Bill; Mountain Ash Local Board Bill; Newark Corporation Bill; Northallerton Water Bill; Troon Water Bill.

Standing Orders not complied with: Lynton Water Bill.

Further Standing Orders complied with: Partick, Hillhead, and Maryhill Gas Bill.

HOUSE OF COMMONS.

Monday, Feb. 2.

The petitions were presented for the following Bills, which were ordered to be brought in :—

Barmouth Local Board Bill, by Mr. S. Rendel and Mr. Kenyon.
Birkenhead Corporation Bill, by Sir E. Hamley and Mr. Whitley.
Bognor Water Bill, by Lord W. Lennox, Sir W. Barttelot, and Sir H. Fletcher.
Croydon Water Bill, by Mr. Herbert and Mr. Bonsor.
Edinburgh Municipal and Police Bill, by Mr. Childers, Mr. M'Ewan, Mr. Wallace, and Mr. Buchanan.
Falmouth Water Bill, by Mr. Bickford-Smith and Sir J. Kennaway.
Fylde Water Bill, by Sir M. W. Ridley and Mr. Tomlinson.
Garw and Ogmore Gas Bill, by Mr. A. Williams and Mr. S. Evans.
Keighley Corporation Bill, by Mr. Holden and Mr. Craven.
Leighton-Buzzard Gas Bill, by Mr. C. Flower and Mr Whitbread.
Manchester Corporation Bill, by Sir J. Fergusson, Sir H. Roscoe, Mr. J. Bright, and Mr. Maclure.
Market Drayton Water Bill, by Mr. Hill and Col. Kenyon-Slaney.
Nelson Corporation Bill, by Sir Henry James, Mr. Addison, and Viscount Cranbourne.
Penmaenmawr Local Board Bill, by Mr. Rathbone and Mr. Bryn Roberts.
Rhyl Gas Bill, by Mr. West and Mr. Whitley.
Southwark and Vauxhall Water Bill, by Sir J. Ellis and Mr. Beadel.
Stourbridge Gas Bill, by Mr. J. Corbell and Mr. Brooke Robinson.
Stourbridge Improvement Commissioners, by Mr. J. Corbett, Mr. Godson, and Mr. S. Hill.
Sunderland and South Shields Water Bill, by Mr. Storey, Mr. Gourley, and Mr. Wood.
Western Valleys (Mon.) Water Bill, by Mr. F. Morgan and Mr. Warmington.

Tuesday, Feb. 3.

The Examiners reported that the Standing Orders had not been complied with in the case of the petition for the Lynton Water Bill. The report was referred to the Standing Orders Committee.

METROPOLITAN WATER COMPANIES' CHARGES BILL.

Mr. CAUSTON asked the First Lord of the Treasury, with regard to his promise to offer facilities for referring to either a Select or a Hybrid Committee the various Bills now before Parliament relating to the acquisition by some public body of the undertakings of the Water Companies of the Metropolis, whether he would give facilities for the passing of the Metropolitan Water Companies' Charges Bill, which contains provisions to prevent the Companies from raising their rates through the quinquennial revaluation of premises, in prospect of the early purchase by the public.

Mr. W. H. SMITH: It will be impossible for the Government to give facilities for such a Bill, as our responsibilities must be limited to finding time for Government measures. I will not enter into any argument as to the matters which are naturally suggested by the question of the honourable member; but I may say that, if the various Water Bills were referred to a Committee, that Committee would have full power to consider the terms and conditions on which the undertakings of the Companies were to be acquired.

THE QUALITY OF THE GRAND JUNCTION COMPANY'S WATER.

Mr. TATTON EGERTON gave notice of his intention to ask the President of the Local Government Board on Thursday, the 12th inst., "whether his attention has been called by the Official Examiner to the condition and quality of the water supplied by the Grand Junction Water Company; whether he is aware it is the worst sample delivered by the Company during the past 12 years, that it contains 50 per cent. more volatile matter, 300 per cent. more saline ammonia, and 250 per cent. more organic ammonia than the water supplied on the same date by the Chelsea Water Company drawing from the same source, and that it also exhibited marked browning on ignition of solids; whether the information now in his possession confirms his statement of July 31, 1890, that there is 'no abundant vegetation or cut grass, &c., spread about the Thames Valley,' to account for the condition of the water; whether his advisers are still prepared to deny contamination with sewage, and will certify that this water is fit for human consumption; what position does Dr. Tidy hold with relation to the Local Government Board, and by whom his salary, as Water Examiner, is paid; how many weeks' supply is stored by the Grand Junction Company; and what steps the President has taken to compel the Company (after his answer that the filtration power was deficient) to create a larger storeage and filtration."

Wednesday, Feb. 4.

LONDON WATER COMMISSION BILL.

The Sheriffs of London (Mr. Farmer and Mr. Augustus Harris), accompanied by the City Remembrancer, appeared at the Bar of the House, and presented a petition from the Mayor and Commonalty of the citizens of London, praying for leave to introduce the London Water Commission Bill. Leave was given in due form; and the Bill was ordered to be brought in by Mr. Baring and Sir J. Ellis.

During the past week the following progress was made :—

Bills read the first time, and referred to the Examiners: Bognor Water Bill; Falmouth Water Bill; Fylde Water Bill; Leighton Buzzard Gas Bill; Rhyl Gas Bill; Southwark and Vauxhall Water Bill; Stourbridge Gas Bill; Sunderland and South Shields Water Bill.

Bills read the first time, and ordered for second reading: Barmouth Local Board Bill; Birkenhead Corporation Bill; Croydon Water Bill; Edinburgh Municipal and Police Bill; Garw and Ogmore Gas Bill; Keighley Corporation Bill; London Water Commission Bill; Manchester Corporation Bill; Market Drayton Water Bill; Nelson Corporation Bill; Penmaenmawr Local Board Bill; Western Valleys (Mon.) Water Bill.

Petitions against the following Bills were presented :—

Croydon Water Bill, from the London County Council.
Rhyl Gas Bill, from the Rhyl Improvement Commissioners.
Stourbridge Improvement Commissioners Bill, from the Stourbridge Rural Sanitary Authority.
Western Valleys (Mon.) Water Bill, from the Guardians of the Bedwelty Union.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Thursday, Feb. 5.

(*Before Mr. Justice* ROMER.)

Dairy v. Bailey—Dispute as to a Gas-Globe Patent.

This was an action for an alleged infringement of a patent for improvements in gas and lamp globes.

Mr. HALDANE, Q.C. (Mr. HEALEY, Q.C., with him) said the defence simply amounted to prior publication. Having reminded the Court that the ordinary old-fashioned form of globe or lamp-shade was made with a hole in the top, he said it seemed to have occurred to inventors many years ago that such globes might be improved by the insertion of holes in the sides. One modification of the old plan was the addition of a reflector; the reflector and globe being combined in one. This general idea was tried several times, but never successfully until the plaintiff invented a special design of globe, which had been very successful. They were called "Albert" globes, and were well-known in the trade. Their specialities were, first, the openings or slots in the sides—not vertical or circular but horizontal; secondly, a large aperture at the bottom, instead of the small opening usual in the old globes, to admit the air more freely, and enable it to rise to the slots and produce certain results; thirdly, the slots were arranged in a particular way, and in proportion to the aperture at the base. This also was a very important element. One reason for it was that it had been found that a large amount of reflected light could thus be obtained; another being that currents of air were thereby produced in the globes, and more efficient combustion of the gas obtained. For the defence, it was denied that any infringement existed in the case; but seeing the general similarity in shape and design, the defendant must be left to distinguish his globe from the plaintiff's. The usual string of objections to the invention had been brought forward, and reference was made to an expired patent—Harrison and Patston's—which defendant had raked up and which he alleged showed prior anticipation of plaintiff's. The learned Counsel concluded by reading the plaintiff's specification.

Mr. *W. Foster*, M.A., F.C.S., stated that the plaintiff's design of globe was the first he had seen which carried out the objects intended. Harrison and Patston's patent of 1854 was for a small globe with holes in the sides; but there was no actual similarity between it and the plaintiff's invention.

In cross-examination (a globe made under the earlier patent mentioned having been handed to witness), he agreed that the slots round the top would effect the same purpose as those in plaintiff's design.

In answer to his Lordship, Mr. HALDANE admitted that if it could be proved that the form of globe in question had been sold prior to the date of the plaintiff's patent, his case would be at an end.

Mr. NEVILLE, Q.C., for the defendant, said he would prove that a Mr. Fisher had sold globes of precisely this pattern to Messrs. Sugg and Co. before 1885.

Mr. HEALEY said the plaintiff's evidence showed that, though a certain form of globe had been sold to Messrs. Sugg something like 18 years ago, they were not like the plaintiff's globe at all.

His LORDSHIP intimated that, after Mr. Foster's evidence, plaintiff's case appeared to be hopeless as it stood.

Mr. HALDANE (after a short consultation) said he and his learned friend had come to the conclusion that, if this was his Lordship's views upon the specification, they would not be justified in carrying the case farther, as that really disposed of it.

His LORDSHIP, in delivering his formal opinion, said that, looking at the complete specification, he was satisfied that the claim was, as there stated, for "a globe and reflector combined in one piece, having horizontal slots or apertures at or near the greatest diameter of the globe, substantially as described and set forth in the drawings," but was not limited to any particular form of globe. Neither was it limited to any special proportion of the apertures, but it was intended to be a claim for all globes or shades substantially of the kind set forth in the drawings, so long as they had horizontal slots or apertures at or near the greatest diameter of the globe. This being so, and having regard to the prior publication of Harrison and Patston's specification, and to the evidence of the only witness called for the plaintiff, he must hold that the patent could not be sustained, and that the action must be dismissed with costs.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.
Thursday, Feb. 5.

(*Before Baron* POLLOCK *and Mr. Justice* CHARLES.)

Dillon (Surveyor of Taxes) Appellant, v. Corporation of Haverfordwest, Respondents—A Gas-Supplying Corporation's Liability for Income-Tax.

This was an appeal by the Crown from the decision of the Income-Tax Assessment Commissioners, allowing the Corporation of Haverfordwest to make certain deductions from the sum in respect of which income-tax was payable by them. The facts of the case are sufficiently stated in the judgments.

The SOLICITOR-GENERAL (Sir E. Clarke, Q.C., M.P.), and Mr. DANCKWERTS appeared for the Crown; Mr. GORE for the Corporation.

Baron POLLOCK said this was an appeal against the decision of the Assessment Commissioners, who had come to the conclusion that the Haverfordwest Corporation were entitled to make certain deductions before they became liable for what were called "profits" under the Income-Tax Acts. The Corporation had authority by an Act passed in the year 1856, to erect gas apparatus and light the streets and roads of the borough. They also had power to utilize the apparatus for the purpose of supplying any persons who were willing to buy gas of them, and to receive payment for it; but they were not to sell the gas for private consumption until they had performed the duty imposed upon them by the Act, of supplying the street lamps. On the public supply, therefore, there could not be any profit; but upon the gas sold to private consumers, some was realized. In the first instance, the Corporation were assessed upon this profit. They then applied to the Assessment Commissioners, who made certain deductions; and from this decision the Crown appealed. He had come to the conclusion that the appeal must be allowed. The statute under which the Corporation were assessed was the one which was applicable to the profits of all persons making gas. It was therein provided that the "annual profits" of all gas-works should be understood to be the full amount of one year, or the average amount of one year of the profits received therefrom. By a sub-section, this was made applicable to gas-works; and it was as the owners of such works that the Corporation were assessed. The provision with regard to deduction, which was to be found in Schedule D of the Act, provided that, in estimating the balance of profits and gains, deductions were to be made for any disbursement or expense, not being the money wholly and exclusively laid out for the purpose of such trade. It was clear that any expense incurred in performing the duty of supplying the town was not an expenditure for the purpose of the trade in respect of which they were assessed; the Corporation being bound to provide for the lighting of the town. They might either buy the gas or make it; and as they elected to make it, of course the expense would be met by a rate upon the town. They were in no sense traders; and they were not vendors—there being no vendees. They were in the position of principals and agents; that is to say, they were agents to make gas for the principals—viz., the people of the town. By a section of the Private Act, however, the Corporation had the option (there was no compulsion) to do more if they liked. After lighting the streets and roads, they might sell gas to anyone who was willing to buy it. This they had done; and consequently there arose the position of vendor and vendee. Profits then, for the first time, arose from the trade. The Corporation, by selling the gas under the provisions of the Private Act, became a trading company; and the profits were none the less profits, whatever their ultimate destination might be.

Justice CHARLES said that as soon as the Corporation had performed the parliamentary duty of lighting the public streets, they were at liberty to sell gas to private consumers. What was the trade they then carried on? It was the trade of supplying gas for private consumption Their operations, so far as the public streets were concerned, were not carried on by them as a trade at all; but, as was said by Chief Justice Dallas in a case which came before the Irish Courts, for the purpose of supplying themselves with gas. In no sense could the Corporation be said to be carrying on a trade in lighting the public streets. But they began to be tradespeople as soon as they had customers; and the customers were those who contracted with them to take gas. Then it was said the deduction was not liable. The deduction was the cost of lighting the public lamps—an expense incurred in the discharge of a public duty. It was said that, though this was so, it was exclusively laid out or expended for the purpose of the trade of the Corporation. Mr. Gore had argued that, under section 53, a private customer could not be supplied without this expense being incurred, because it was only after the Corporation had sufficiently lighted the streets that they could sell gas to private consumers. This was a captivating way of putting the case; but, on reflection, he (Justice Charles) could not assent to it. He thought the expenditure was not for the purpose of the trade in question, which was that of supplying private customers only, but to enable the Corporation to enter on the trade. The Act did not indicate that the initial expenditure, which might be described as in the nature of capital expenditure to enable persons to enter into a particular trade, was to be deducted from the amount of interest earned in the trade.

The appeal was allowed, with costs.

SALISBURY CITY QUARTER SESSIONS.—Saturday, Feb. 7.

(*Before Mr.* W. RAVENHILL, *Deputy-Recorder.*)

The Assessment of the Salisbury Gaslight Company's Works and Mains.

Judgment in this case, the hearing of which was reported in the JOURNAL last week, was delivered to-day.

The DEPUTY-RECORDER said that since the adjournment, by the courtesy of Counsel and the witnesses in the case, he had had an opportunity of going very carefully into all the figures, and considering the matter in all its bearings. He found that the Gas Company held—he would not say an absolute monopoly—but still they carried on their business under the protection of various Acts of Parliament, which really amounted to a monopoly. The undertaking must be regarded in that light in considering the question of the amount that a hypothetical tenant might be presumed to be willing to pay as rent for it. He found that the Company received about £10,000 per annum for gas, and £2271 for residuals; and that they were able to divide among the shareholders about £2170 per annum as profits. These facts were set forth in the published accounts of the Company. Of course, in considering these receipts of £12,000, the deductions that the law obliges had to be made; and he had made these deductions. He did not, however, altogether agree with the valuation prepared by Messrs. Castle; but, on the other hand, he was so far from agreeing with the estimate furnished by Mr. Jones and Mr. Stevenson that he felt bound to dismiss the appeal, and to affirm the valuation of the Assessment Committee, which appeared to him to be as nearly correct, as it was possible for human ingenuity to devise. He therefore dismissed the appeal with costs.

Mr. SETON asked if the Recorder would consent to state a case, on the ground that no reason for such a large increase in the rateable value was given in the judgment.

The RECORDER: I have no reason that, by law, I am bound to give. In this case, looking at all the circumstances, I feel bound to come to the conclusion just stated, and shall not grant a case. Of course, what holds good in one parish does so in all.

The London Coal Dues.—The Kensington Vestry have unanimously decided that it is expedient, in the interests of the ratepayers, that the London Coal Dues should be re-imposed, and that communications should be addressed to the various London Vestries and District Boards asking them to discuss the matter, and to appoint delegates to a conference, with a view to bringing the question before the Government. The Vestry of Hammersmith passed a similar resolution a few weeks ago.

The European Water-Gas Company's Action Settled.—It may be remembered that in August last year an action brought by the European Water-Gas Company against the London and Colonial Finance Corporation, to recover damages for breach of contracts, resulted in a verdict for the plaintiffs. Notice of appeal was given; and the case was in the paper last Tuesday. Sir Horace Davey, Q.C., stated, however, that the matter had been settled; and he asked leave to withdraw the appeal. Mr. Asquith, Q.C., on behalf of the plaintiffs, assenting, the Master of the Rolls sanctioned the arrangement.

The Quality of the Southend Water.—The recent epidemic of typhoid fever at Southend having been attributed to the water supply, Dr. C. Meymott Tidy was requested by the Southend Water Company to make an analysis of their water. He has found it to be of uniformly excellent composition; one of its chief characteristics being its extraordinary organic purity, for it practically contains no organic matter whatsoever. Southend would appear to have one of the purest water supplies in England, as the microscopic examinations have failed to reveal any signs of animal or vegetable life; and from a medical point of view, it is not understandable how anyone can have suggested it as a possible cause of typhoid. The Company are to be congratulated upon the conclusive proof thus afforded of the purity of their supply.

Committal of a "Philanthropist" for an Unpaid Water-Rate.—At the City of London Court last Wednesday, before Mr. Commissioner Kerr, the case of the *East London Water-Works Company v. Austin* was heard. The Company had obtained a judgment against the defendant, Mr. Walter Austin, of the London Cottage Mission, Finsbury Pavement, E.C., for £40, for water supplied to the mission. As the order of the Court had not been complied with, Mr. G. Kebbell, the Company's Solicitor, applied to have Mr. Austin committed to Holloway Gaol. Mr. Kebbell said defendant sent out a Christmas appeal just at the time the proceedings were brought. The country was flooded with the appeal, which was most heart-rending; and the public had, in all probability, as usual, liberally responded. Defendant was still carrying on the mission. Evidence was given that he employed three clerks, and that in the previous week he defended an action for malicious prosecution brought against him—having a Q.C. as well as other counsel to appear for him. Mr. Lewis Davis, who appeared for the defendant, said the clerks referred to were not shown to have received any salary. Mr. Kebbell said two of them were detectives, who followed Austin about to "cover" him, and give him information. Mr. Commissioner Kerr said there was evidence of the defendant's means to pay; and he should order his committal to prison for 40 days. Mr. Davis asked that the warrant might be suspended for a short time. Mr. Commissioner Kerr said, "No; not a moment."

Cape Town and District Gaslight and Coke Company, Limited.—The first ordinary general meeting of this Company was held last Friday at Winchester House, E.C. In the unavoidable absence of the Hon. Henry Noel (the Chairman), Mr. J. B. Boustead presided. The Chairman said that he had not very much to say to the shareholders that day, because the meeting was only a formal one called for the purpose of complying with the statute; and the Board had been occupied up till now with the transfer of the gas-works at Cape Town, which had been carried through, and a cable was daily expected informing them that the Woodstock works had also been completed in terms of the agreement to purchase, and transferred. Instructions had been sent to the Manager at Cape Town to turn his attention, first of all to effecting a saving in the large percentage of loss through unaccounted-for gas, which stood so high under the old Company. In the meantime, the Board were considering plans and specifications for putting the plant and works into more modern shape, so as to reduce the cost of working, and give the inhabitants gas of a higher illuminating power than that to which they had been accustomed. He would not promise the shareholders a large dividend the first year, while these alterations were in progress; but he might say that the view of the Board, that they had made an excellent purchase, was fully confirmed by a member now in Cape Town, and that time alone was necessary to make the Company a successful one. An extraordinary general meeting was also held, to sanction the altering of certain of the Articles of Association, rendered necessary to obtain a Stock Exchange quotation for the shares and debentures.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Chief Offices, Horseferry Road, Westminster—Colonel MAKINS, M.P., in the chair.

The SECRETARY and GENERAL MANAGER (Mr. J. Orwell Phillips) having read the notice convening the meeting, the report of the Directors, with those of the Chief Officials, and the accounts for the half year ending Dec. 31 last, the principal portions of which were given in the last two issues of the JOURNAL, were taken as read.

The GOVERNOR, in moving the adoption of the report and accounts, stated that the capital account had been increased by the expenditure during the half year of £203,877, less credits of £12,576. On new works and extensions £160,000 had been expended, £38,000 had been spent on stoves and meters, and £7000 on new mains. The balance remaining to the credit of the capital account was £729,437, which was accounted for in this way: Coals on hand, £275,000; coke, £21,000; products, £102,000; and sundries, £173,000—making together £571,000. This left a balance of working capital of £158,000. He thought they had raised their late issues of capital on terms which might be considered satisfactory. In August last, they issued £176,000 6 per cent. preference capital; and last month they issued £300,000 of the same stock. In August they also raised £258,000 of 6 per cent. debenture stock. This nominal amount of £734,000 produced premiums of £370,000. They were now in a good position as regarded their capital, for the first time for several years. They had been keeping their capital as low as they could; but they had found that they could no longer do without raising some more money, on account of the extension of their business. Passing to the revenue account, he stated that they had received from the sale of gas £168,000 more than the amount obtained in the corresponding half of 1889; from meter-rent they had had £1200 more; coke had given them an increase of £48,000; while from tar and tar products, they had received a further sum of £28,300. Altogether, this made £250,000 to the good. The past would have been a very splendid half year, but for the large increase they had had to pay for their coal—£235,000. The coal "boom"—he might almost call it the coal "crisis"—had thrown a great deal of extra weight upon them, and accounted for the large sum they had had to take on the present occasion from the reserve fund. He had noticed that weak shareholders rushed to sell their stock whenever they saw that there had been any necessity for depleting the reserve fund; but these shareholders did not understand the working of the Company. Each half year could not possibly stand on its own basis, so far as their Company was concerned; and they had occasionally carried to the reserve large sums—the object being to meet just such a crisis as had occurred in the year gone by. He thought that the way the matter had worked out in the past year showed them—if anything could show them—what a very stable constitution their Company had. They had been charged with dividing in the last two years some £430,000 more than they had earned; but this was not a correct way of putting it. They had spent the money out of earnings, though they had allocated it to different half years. The money had been earned, and put by for a rainy day; and when the rainy day came, they took it out of their money-box, and used it for maintaining their statutory dividend. He thought the proprietors could see that there was not the least cause for alarm. If they found that the reserve fund was being unduly depleted, they could raise the price of gas; but it had always been the policy of the Company, and of the other Metropolitan Companies, to keep the price as low as they could. There was no object in fining the public more than was necessary for gas, and reducing their own dividend correspondingly, in order to keep up a large reserve fund and undivided balance. He had no doubt that, as the crisis passed by, things would come right, and that the reserve fund would be rapidly filled up again. At their meeting a year ago, he foreshadowed what had occurred. He then said the whole of the £260,000 of undivided balance would be wanted that year; and that they might have to dip into the reserve fund. He admitted he had not thought at the time they would require more than £100,000; but the extra £45,000 they had drawn from the reserve fund gave him no alarm about the future of the Company. The increase in the price of coal had been very serious—having amounted to 4s. per ton; and the same high contracts would continue in the present half year. It would perhaps be necessary to resort again to the reserve fund this half year, in order to pay their statutory dividend, and maintain the price of gas at its present level. If—though he considered it improbable—the price of coal remained as high as it was now, or went still higher, they would have to call on the public to bear their share, and to raise the price of their gas. He, however, thought there were indications everywhere that the "boom" was played out, as far as very high prices went. Not only gas, but railway and other companies had had the same experience as themselves in regard to the price of coal. The Sheffield Railway Company paid 6s. a ton more; and he believed that the Great Eastern Railway Company, with which he was connected, had paid a higher increase than their own Company. From certain tenders recently received by the Great Eastern Company, they saw that there was a reduction of about 10 per cent. in prices all round. In the opinion of some persons, the stock of coal held by the Company might be large; but, looking at the enormous amount of their business, and the uncertainty—owing to the weather—as to what might be required of them, they felt justified in keeping the large stock they had held. As it was, one or two of their works went out for the want of fuel. Still, by the policy they adopted in this matter they had been enabled to satisfy the public demands, even on the day when they sent out 126 million cubic feet of gas—the largest day's supply they had ever sent out; and exceeding the supply of the corresponding day in the previous year (Dec. 30, 1889) by more than 10 million cubic feet. Translated into money, the 126 million cubic feet of gas meant that, if they had been retail traders, they would have been paid £17,000 across the counter for it; and it also meant the carbonizing of about 13,000 tons of coal. During the past year, there had been on several occasions difficulties with the men at the collieries; and when the output from the collieries from which they were supplied was restricted, they ran a risk of deficiencies in the supplies. This was another reason for keeping a large stock on hand. Of course, there were drawbacks in doing this. For instance, they lost the interest on the money; and there was the deterioration in the coal, through its being kept in the open. Taking all things into consideration, however, it was the safest as well as the wisest policy; and he hoped the proprietors would endorse it. After referring to certain details in the working expenses, he stated that last year they sold 18,536 million cubic feet of gas, producing £2,450,000, against in the previous year 18,105 millions, which produced £2,287,000. The increase in the quantity of gas sold last year had been very remarkable. In the first half of the year, there was no increase—there was, in fact, a small decrease; but, so bad was the weather in the latter six months of the year, that the total increase in the quantity of gas sold for the half year—and for the whole year—in spite of the small decrease in the first half, was 5·16 per cent. If they looked back for the last five years, they would see that the percentage of increase was, on the average, wonderfully steady; amounting to just about 3 per cent. per annum. This was what they might fairly look for; and, as far as he could judge and see, the progress of electric lighting had not in any way affected the normal rate of increase. Much less was it affecting their existing business; and he did not think it was likely to. The unaccounted-for gas had been only 4·64 per cent., against 5·03 per cent. in the December half of 1889. This was a considerable improvement. Coke had been very good. The price received had been 11s. 9d., against 10s. 1d.; and he thought that in the present year it would be even better. There was nothing to remark about breeze. Tar and tar products had produced excellent results, giving them £48,000 more; but from ammoniacal liquor and its products, they had received £19,044 less. He could not account for this. He supposed that the nitrate of soda market and the sulphate of ammonia market sympathized with each other; and when one went down, the other followed. The capital per ton of coal employed was £5 16s. against £5 14s. The reserve fund, if they declared the dividend recommended, would be reduced from £531,395 to £385,700; and, as he had already said, this amount might be still further reduced, though he did not expect to see it fall below £250,000. From this point, unless appearances were deceitful, he thought it could be brought up to its old level again. The gas-stoves on hire had increased by 40 per cent. in the past half year; and the stoves sold to consumers—an even more satisfactory feature—had increased by more than 50 per cent. Their fuel trade, therefore, which electric lighting could never touch, was really becoming a very important part of the business. In view of this increase they had arranged to augment their productive power by 9 per cent.; and they might still further increase it by water-gas plant. They were at the present time using this plant, and it was giving very good results—24-candle gas; and they used it for enriching purposes instead of cannel coal, which was now so scarce and expensive. Unfortunately, they might not be able to be quite ready for the early part of next winter with their storeage, owing to the hindrances caused by the recent unprecedented frost. Every effort would, however, be made to get the working plant in order for the next dark weather. The generating plant would, no doubt, be ready; and this was more important than the storeage. There had been a satisfactory increase in the number of small dwellings supplied with the Company's gas—440 in the half year; and there had also been an increase in gas-engines of 173, making 2071 gas-engines altogether. There had been the usual increase in the mileage of mains; and in the area of their district of 62¾ square miles. They had now 1861 miles of mains. With reference to the labour question, they had had a certain amount of anxiety; but he was glad to say that, as far as they could judge from appearances and from what they heard, the relations between the Company and their employees were now of a satisfactory character. All their regular hands were working under a 28 days' agreement; and the greater part of the winter hands also. He could not help thinking that their men, on reflection, must see what a very desirable service that of the Company was, with the eight hours' work a day, for which 5s. 4d. was paid, the excellent houses which were provided at very low rents, the reading-rooms, and the sick and provident fund to which the Company largely contributed. Altogether, he could not conceive any service of the kind which offered greater attractions than their own. They were also lightening the labour by the introduction of appliances for the lifting and handling of coal. As to the local taxation of the Company, this was very heavy; and the Directors were availing themselves of the opportunity of the quinquennial valuation to endeavour to obtain some relief. Surveyors and lawyers were expensive; but he trusted that the game might pay for the candle. He hoped the shareholders would not be alarmed by the figures. In their Company the figures were large, as were also the alterations in profit and loss; but the constitution of the Company provided that they would get a steady dividend. In bad times it might go down ¾ per cent. as it had done; and it might drop another ¾ per cent. by their raising the price; but he saw no reason to doubt that the Company would continue to progress. The fact that they had to supplement their dividend out of the reserve fund did not prove that the business was falling away—an idea which would, indeed, be absurd in face of the increase of 5 per cent. in the quantity of gas sold.

The DEPUTY-GOVERNOR (Mr. H. C. Ward) seconded the motion.

Sir F. MAPPIN, M.P., considered that the circumstances of the Company were extraordinary. During the last two years £450,397 of the reserve fund had been absorbed; and if they took the same amount in the next two half years which they proposed to draw this half year from that fund, they would practically have no reserve fund left. The Directors had received £115,000 from the advance in the price of gas in the half year, or the position of the Company would have been worse. Their capital five or six years ago was £10,500,000; but this had since been raised by more than £1,000,000. The Directors had vacillated in the way they had treated the public. In January, 1888, the price of gas was reduced from 3s. to 2s. 9d.; in January, 1889, it was further reduced to 2s. 6d.; and in June, 1890, the price was advanced to 2s. 9d. He did not think this was the way to treat the consumers when they had before them such a formidable opponent as the electric light, the effects of which the Company would certainly feel. He

hoped the Board would not continue to raise the price of gas to enable them to pay the enormous dividend of 13 per cent.; for, if they did, he felt sure their important undertaking would suffer.

The GOVERNOR, in reply, said he was astonished that Sir F. Mappin, who presided, he believed, over the Sheffield Gas Company, had not gone a little more closely into the figures before alarming the shareholders by such a statement as that which he had just made. It was quite true they had raised an additional million of capital; but Sir F. Mappin had left out of consideration altogether that a considerable part of this was premium capital, obtained under the auction clauses, on which the Company paid nothing. Their capital per ton of coal carbonized in 1886 was £6 5s. and now it was £5 6s.; so that they were practically in a much better position than they were four years ago. The fact of so considerable an amount being raised at once was owing to their having had for some time previously such large balances; otherwise they would have had to do what he supposed they would do in future—increase the capital by about £200,000 a year, in order to meet the extension of their business. He did not know what the result of the investment would be of so much money in electric lighting. Whether rich London would take enough of it to give a decent dividend on the capital might be a matter of doubt. But as far as their Company was concerned, their people who took the electric light were, in most cases, those who did not burn gas in their rooms, though they used it in their kitchens; and they were apparently consuming more gas every year for cooking and heating purposes. With respect to the changes in price, this was a matter which, under the sliding scale, was regulated automatically. They always tried to avoid raising the price; and he did not think the consumer had any ground of complaint. As to the amount which had been taken from the reserve fund, it was not likely the consumer would have stood tamely by and seen the price raised when the Company had an undivided balance in hand of £400,000. If Sir F. Mappin went more closely into the matter, he would see there was no cause for the alarm he felt.

Mr. GEORGE LIVESEY said he sympathized very much with Sir F. Mappin. He hoped that, as the Governor had said, the relations of the Company with their men were satisfactory. So far as he could hear, they were afraid of their men, towards whom they had pursued a policy of weakness. If they had a 28 days' agreement with the men, why had they allowed the latter to send away the cargo of coal brought in the *Black Diamond*, which, at the Company's earnest request, was loaded by a colliery whose men were on strike, manned with a free crew, and blocked by the Seamen's Union? If the men refused to discharge it, and then broke their agreement, under the Conspiracy and Protection of Property Act they would be liable to three months' imprisonment. During the strike at the South Metropolitan works, The Gaslight and Coke Company sent a telegram to the North ordering those who sent them coal to employ only Union men; and he had heard that similar requests were now being made. He hoped that this was not true; for if they were playing into the hands of the Unions like this, it was a proceeding which would come home to them. At their last meeting, he animadverted on the price the Company were paying for their coals; and he maintained what he said on the occasion in regard to this matter. The effect of cancelling the old contracts—running at about 6s.—and making new contracts on the basis of 12s. 6d., was to put up the price of coal in the June half by about £124,000. Half of this ought to have come into the six months under review, which would have made the price paid for coal look still worse. There was a fatal flaw in their policy. They were a protected Company; and when anything adverse occurred to them, or was impending, it was said the public must pay for it. He gave them credit for good intentions with regard to coal; but the feeling that the public must pay if the price of coal or of labour went up, was not likely to produce the best results. He contended that this was not the proper way to act. What this Company and every gas company should do, was to conciliate the public. They had scores of customers who paid the Company £5000 a year; and he maintained that in these cases the Company should adopt the policy which had been taken by other gas companies, and allow a discount. By charging the same price all round, they really made the larger customer pay more than the smaller, because the expenses of administration were less by nearly 2d. per 1000 cubic feet in the case of the larger consumer. A great number of the Company's large consumers felt that they were not being fairly treated; and it was only human nature for them to say they would use the electric light. The Company had really had practically little or no increase of business last year, if they took away the additional gas sold in the exceptional weather of November and December; and he felt that this was due to their losing business through the electric light. The Company ought to sell gas at the lowest price in London; for they had the finest district in the kingdom. Instead of this, however, they had sold their gas at the highest price for the last 25 years or so. He would be told that The Gaslight and Coke Company was the pioneer Company, and that their capital was lost in the early days. In 1860, however—long after the early days—their capital was £660,000; and the quantity of coal carbonized was 130,026 tons, which worked out at £5 1s. 6d. per ton. Since then they had amalgamated with seven Companies; every one of them being in a better position than their own, with lower capitals, and better able to supply gas. He had taken Mr. Field's figures from the year 1869; and he found that, if the Company had sold gas at the same rate as the lowest price charged in London in these years, they would have received from the public £5,265,000 less than they had done. One-half of this excess had been taken from the consumers since 1882. He was sure that the Governor and his colleagues were animated by the best intentions as to the management of the Company, but there was a want of knowledge or capacity somewhere. He made no reflection on the Engineers, who, he considered, were "kept down," and not allowed to have their proper position in the management, which he believed rested with the Directors and Mr. Phillips. If they had been exposed to competition like ordinary traders, they would not have gone into the Bankruptcy Court, as some persons had said, but they certainly would have altered their system.

Mr. COPPIN warmly endorsed the policy of the Directors, who, he felt, had been subject to circumstances which they could not control, nd had come out of the ordeal in an admirable manner. He was a shareholder in the South Metropolitan Company, so he was equally interested in both concerns. The course pursued by the two Companies in regard to the labour question had been diametrically opposite; and he did not entirely agree with the course which Mr. Livesey had adopted in this matter. He considered, too, that the Directors of The Gaslight and Coke Company had made a much better arrangement than the South Metropolitan Company were working under. As to conciliating the public, what step could have been taken more calculated to ensure that than the withdrawal of money from the reserve fund to pay the statutory dividend, instead of paying it by raising the price of gas. He did not consider 13 per cent. an extravagant dividend to pay, in view of the risks they ran. To meet the requirements of the public, it was necessary from time to time to raise additional capital. It was to be remembered, in regard to the electric light, that the South Metropolitan Company did not suffer as The Gaslight and Coke Company did from this conflict.

Mr. CHANCY inquired whether the works of the Company were now in a protected state.

Mr. GROVES spoke of the extensive use of the electric light in Berlin; and he said that, notwithstanding, the sale of gas had been greater.

The GOVERNOR, in replying, stated that it was difficult to protect the Beckton works in the sense of putting a wall round 500 acres of land. There was, however, the river on one side, and a sewer on the other; and they had a system of drains cutting off ingress to, and egress from the works as well. There was also a public road running from Barking to Beckton; and, unless they barricaded this road, he did not see how they could surround their works with protection. They, however, felt perfectly secure. It was quite true that, during the autumn, there was a certain amount of uneasiness as to what might be the action of the men; and they had felt it to be their duty to be protected against the worst, though they had not believed that the worst would come. They had put up barracks for the accommodation of free labour, had this step been necessary; and they believed that this measure had had a good moral effect. He sincerely trusted they would never have occasion to use these barracks, except for stores. They were not, and they never had been, afraid of their men. What they had been afraid of was whether, by want of conciliation, or by standing too much on their dignity, the danger might not be run of putting London into darkness. If it ever really became a question of the Union or free labour, it would be for the public to judge. For the rest, he thought that a strike avoided was almost as good as a strike won. The construction put by Mr. Livesey on the *Black Diamond* incident was quite wrong. As to the price they charged for gas, they wanted to keep the price as low as they could, having regard to the interests of the proprietors on the one hand, and those of the public on the other, and in a manner mutually beneficial, but consistent with the payment of the dividend which Parliament had authorized. They had always held, and they were still of the same opinion, that it was illegal to charge the consumers different prices. The discount question arose out of the old sore at Nine Elms. It was not likely, after they had vindicated their policy in this matter before the highest tribunal, that they were going to change it, and do what they considered would be wrong. Mr. Livesey thought that the Engineers did not have a free hand; and he said that the Company was, in fact, the Directors and the General Manager. Their Chief Engineer (Mr. G. C. Trewby) was then present; and he understood that this gentleman was perfectly satisfied with the confidence placed in him by the Board. He thought that the remark made by Mr. Livesey on this subject was not in accordance with fact, and was rather uncalled for under the circumstances. He had been in hopes that the "hatchet" had been "buried." He could assure the proprietors that the position of the Directors had not been a bed of roses in the past year; and he was glad to know they had the sympathy and support of the great body of the shareholders.

The motion was carried *nem. con.*

Resolutions were afterwards passed, declaring the dividend recommended, and re-electing the retiring Directors and Auditors; and, at a subsequent extraordinary general meeting, the Bill in Parliament for conferring further powers on the Company was approved.

A vote of thanks to the Governor, Directors, and officers terminated the proceedings.

The Proposed Water Commission for London.—The Kent County Council have resolved to oppose the London Water Commission Bill on principle, and also because there is no provision for a direct representation of Kent on the proposed Commission.

The Vyrnwy Water Supply.—The Water Engineer of the Liverpool Corporation (Mr. G. F. Deacon) has been instructed to take the preliminary steps for laying a 12-inch pipe-line across the Mersey, and also for laying a supplementary line at some future time, for the conveyance of a supply of water from Lake Vyrnwy. The cost of the work already approved by the Water Committee will be about £3500.

Explosion at the Clitheroe Gas-Works.—An explosion took place late at night last Saturday week at the Clitheroe Gas-Works, doing great damage to the machine-house, and seriously injuring the Manager (Mr. William Miles) on the face and arms. He went into the machine-house about eleven o'clock to light a burner, when an explosion occurred. The building was completely wrecked; the roof being lifted off, and the doors and windows smashed.

The Newcastle Electric Lighting Company's Provisional Order.—At the meeting of the Newcastle City Council last Wednesday, Mr. Alderman Winter presented a report on the negotiations which had taken place between the Town Improvement Committee and the Newcastle and District Electric Lighting Company as to the terms of the Provisional Order of the latter. The Committee, the report stated, had had several interviews with the Directors of the Company; and it was ultimately resolved to recommend the Council to consent to the proposed Order, on condition that they should have the option of purchase at the end of 31 years, instead of 42 years, from the commencement of the Order; that the maximum rate of dividend should be 8 per cent.; and that all profits above should be equally divided between the consumers and the shareholders. These terms were agreed to by the Company. The report was adopted.

THE BOARD OF TRADE REPORT ON THE GAS, &c., BILLS AND ORDERS OF THE PRESENT SESSION.

The Board of Trade report on the Gas, Electric Lighting, and Water Bills and Provisional Order applications for the present session has just been issued. It shows that the number of Bills relating to the supply of gas is 16—being 14 for England and 2 for Scotland. Three of these Bills also contain provisions relating to the supply of water, and one electric lighting. The capital proposed to be raised is £323,926—£223,000 by shares, and £100,926 by loan. There are 22 Bills relating to the supply of water, of which only 3 relate to Scotland; the total capital asked for being £2,097,402—£1,060,150 by shares and £1,037,252 by loans. Provisional Orders to the number of 14 have been applied for in respect of gas and water, and 70 in respect of electric lighting. The capital proposed to be raised under these Orders is: For gas, £130,000; for water, £98,000; for gas and water combined undertakings, £31,250—total, £259,950. For electric lighting the proposed capital is £2,125,090. As compared with last year, the number of Gas Bills has increased by five; that of Water Bills by one—the total for the two classes being now 38, as against 32 last year, and 45 in 1889. The capital required for gas purposes is £264,334 less, and that for water purposes £1,519,348 less than last year. The total capital proposed to be raised by the Gas and Water Bills amounts to £2,421,328, or £1,783,682 less than in 1890. For Gas and Water Orders the capital proposed is £25,626 less than in 1890. The applications for Orders in respect of electric lighting show a great falling off—70, as against 161; the capital proposed to be raised under them being £7,117,828 less than last year. The report contains, as usual, an analysis of the Bills and Orders.

METROPOLIS GAS SUPPLY.

The Recent Appeals to the Chief Gas Examiner.

The *Board of Trade Journal* for the past month gives the following account of appeals recently made to the Chief Gas Examiner for the Metropolis (Dr. Williamson, F.R.S.) by the London Gas Companies against reports by local Examiners on the quality of their gas:—

In November last, Dr. Williamson heard an appeal by the South Metropolitan Gas Company against the report of the Gas Examiner at the Foster Place testing-station of deficient illuminating power in the gas delivered by the Company on the 30th of September. Mr. Frank Livesey appeared for the Company, and Mr. W. J. Dibdin for the County Council. The Company do not appear to have impugned the validity of the official tests nor to have offered any evidence as to the cause of the deficient illuminating power recorded by the Examiner. After contending, however, that the gas was good, and suggesting that the low result of the tests might have been due to the inexact character of the standard of light, the Company withdrew the appeal.

In the appeal of The Gaslight and Coke Company against the report of the Examiner at the Kingsland Road testing-place, showing an excess of sulphur in the gas supplied by the Company on the 29th of September, 1890, decision was given against the Company. In the appeal of the Company against the reports of the Examiner at the Millbank Street testing-place, of excess of sulphur on the 7th and 8th of August last, it was pleaded by the Company that the excess of sulphur in the gas was occasioned by a breakdown of a part of the manufacturing machinery. Decision was given in their favour.

In the appeal of the Commercial Gas Company against the report of the Examiner at Wellclose Square testing-place, of deficient illuminating power in the gas delivered by the Company on Aug. 26, 1890, decision was given against the Company. The deficiency arose from an inferior quality of coal used for making the gas. In the Company's appeal against the report of the Examiner at the Parnell Road testing-place, showing the presence of sulphuretted hydrogen in the gas on July 12, 1890, it was pleaded that the presence of sulphuretted hydrogen in the gas was occasioned by the breakdown of a purifier, and that the breakdown was unavoidable. The decision was therefore in favour of the Company.

The Shropshire Electric Light and Power Company, Limited, has been formed with a capital of £25,000, in £10 shares, to carry on the business of an electric light and power company.

The Bury St. Edmunds Town Council and the Gas Company.—The Lighting Committee of the Bury St. Edmunds Town Council were recently instructed to take into consideration the whole question of public lighting. One of their first steps was to pass a resolution to the effect that the Gas Company should be asked if they were willing to pay back a sum of £2500 advanced on mortgage by the Paving Commissioners in 1849, and charge the Town Council in future 3s. per 1000 cubic feet for gas, inclusive of every cost. This resolution was forwarded to the Directors of the Company; and a reply was received from the Secretary (Mr. H. J. Salmon), stating that the Directors were not willing to comply with the resolution. The Lighting Committee forwarded another letter expressing regret that the Directors had thought fit to decline the suggested terms, and desiring to know whether they definitely declined to refund the loan of £2500 in the event of the Town Council wishing to terminate the existing agreement for the supply of gas. An answer was received stating that the Council, under the express terms of the Gas Act, had no right whatever to ask for the repayment of the £2500; an intimation being also given, with regard to any such question which in the future might arise, that the Directors thought "they ought not in any way now to bind the Directors in the management of the Company." Hence it has been determined by the Lighting Committee that "the Gas Directors having refused to recognize in any way the claim of the Council to be re-paid the loan of £2500 in the event of the Council wishing to terminate the existing agreement for a supply of gas, it is resolved to take counsel's opinion on this and other points connected with the Act."

SOUTH METROPOLITAN GAS COMPANY.

The following is the report of the Directors of the above Company for the half year ending Dec. 31 last, which, together with the accounts for this period [see next page], will be presented to the proprietors at the meeting on the 18th inst.:—

At the last general meeting, the proprietors were informed that, in consequence of the very large advance in the cost of coal, there would probably be a deficiency of £50,000 on the half-year's working, which the reserve fund would be quite strong enough to meet. The accounts now presented show a deficiency of £52,301, caused by an increase due to the advance in the price of coal alone of £68,000, and about £15,000 additional for labour; but in consequence of larger receipts for coke, and a profit of £16,691 on the sale of investments, the exact sum to be taken from the reserve fund to pay a dividend of 13 per cent. is £35,610; but this includes the £6193 paid to the Gaslight Company in the Nine Elms case.

The Directors have refrained from raising the price of gas, because they consider the only use of reserve funds is to meet such crises as those through which the Company is passing. They think it is the wisest course to continue to sell gas at the low price of 2s. 3d. per 1000 cubic feet, in the hope that coal will shortly be obtainable at reasonable rates—believing that in so doing they will be acting in accordance with the trust committed to them by Parliament; and they also believe that, on a broad view of the case, this course of action will most conduce to the permanent advantage of the shareholders.

The best proof that the endeavours of the Company to deal fairly and liberally with the public have been successful (not forgetting the good-will so strongly manifested by the consumers during the strike) is to be found in the very satisfactory increase of business during the past half year. In the Michaelmas quarter, when the weather was of the ordinary character, there was an increase of 5¼ per cent. over the corresponding quarter of 1889. As the Christmas quarter, however, cannot be so compared in consequence of the strike, it is necessary to go back two years, which shows the gas sold in the last quarter to be 14 per cent. in advance of the quantity sold in the corresponding quarter of 1888. Of course, this large increase is, to a considerable extent, due to the exceptional weather in December; but after allowing for this extra consumption, the increase is such as to require further extensions of plant, particularly of mains, to enable a full supply to be given to all parts of the district, which will necessitate the raising of additional capital.

Another most satisfactory feature is to be found in the good-will shown towards the Company by all classes of workmen. The profit-sharing scheme, which was introduced for the purpose of "attaching the men to the Company," and which was the immediate cause of the strike, has produced the desired effect. The Directors feel justified in saying that the confidence of their men has been gained. The men at all the stations have, on various occasions, given hearty expression to their feelings of good-will; but, beyond this, their confidence has been manifested in a most unmistakable manner in entrusting the Company with their savings. In the balance-sheet (No. 12 in the accounts) will be found a new item, "Workmen's Bonus and Savings," which consists of the bonus left in the Company's hands by the men at 4 per cent. interest, together with £2966 of their savings, deposited since July last week by week, in sums varying from 1s. upwards; and, in addition to this amount, the workmen have invested £1657 in the Company's "C" stock, which was offered for sale last August. These facts the Directors consider will be interesting to the proprietors.

The gas supplied by the Company is very strictly tested every day by the London County Council at six different and widely-separated places in the district; and proceedings are taken for every reported deficiency that is not certified by the Chief Gas Examiner to be due to unavoidable cause or accident. The result of the 930 tests for illuminating power made in the half year shows that only four of these tests have been reported as slightly below the parliamentary requirements; while the conditions as to purity, as shown by 2790 tests, have been invariably complied with.

In the two last half years, to assist in liquidating the expenses of the strike, the shareholders cheerfully consented to a reduction of the dividend to 12 per cent. This took 3 per cent. from the "A," 12s. 6d. per cent. from the "B," and 1¾ per cent from the "C" stock. The Directors now feel that it is not just to the shareholders to take from the reserve fund solely for the benefit of the consumers. They have therefore decided to recommend a dividend, not of the full amount of 13¾ per cent., but of 13 per cent., to be apportioned in the usual way in accordance with the Scheme of Amalgamation, excepting a fraction due to "A," undivided as usual. The Directors consider that, in recommending a dividend of 13 per cent., there is every reasonable prospect of its being maintained.

Two Directors (Mr. John Mews and Mr. Simpson Rostron), and one Auditor (Mr. Charles Mortimer) go out of office by rotation. They are all eligible for re-election, and offer themselves accordingly.

The accounts which accompany the report consist of the usual statements. As on previous occasions, we epitomize those portions in which there is little change; giving the remainder in full.

Statements Nos. 1 and 2 show the amount of share and loan capital raised at the end of last year. The former stood at £2,016,500, the latter at £678,000—in each case an increase as compared with the position on June 30, which was the same as at the close of 1889.

Statements Nos. 3, 4, and 5—the capital, revenue, and profit and loss accounts—are given in full on the next page.

Statements Nos. 6, 7, and 8 show the positions of the reserve, renewal, and insurance funds. The reserve fund has been reduced by £48,778 5s. 2d.—viz., from £198,837 9s. 6d. to £150,059 4s. 4d.—which is transferred to the profit and loss account. The renewal fund has been increased from £8190 15s. 7d. to £8837 15s. 3d., and the insurance fund from £12,579 5s. 5d. to £12,715 6s. 3d.; the former by the interest on the amount invested and £500 brought from the revenue account, and the latter by £136 0s. 10d. received for interest.

Statements Nos. 9 to 11—furnishing particulars as to the Company's manufacturing operations—are given in full; as is also No. 12, the general balance-sheet.

ACCOUNTS OF THE SOUTH METROPOLITAN GAS COMPANY FOR THE HALF YEAR ENDED DEC. 31, 1890.

No. 3.—CAPITAL ACCOUNT.

Dr.

	£ s. d.	£ s. d.
To Expenditure to June 30, 1890	..	2,768,871 5 2
Expenditure during half year to Dec. 31, 1890, viz.—		
New buildings and machinery in extension of works	21,917 15 1	
New and additional mains and services	3,141 12 3	
Do. meters	5,047 15 2	
Do. stoves	9,420 5 7	
		39,527 8 1
Total expenditure	..	2,808,398 13 3
Balance	..	140,952 6 9
		2,949,351 0 0

Cr.

Description of Capital.	Certified to June 30, 1890.	Received since that Date.	Total to Dec. 31, 1890.
	£ s. d.	£	£ s. d.
By A stock	500,000 0 0		500,000 0 0
B stock	1,350,000 0 0		1,350,000 0 0
C stock	141,500 0 0	25,000	166,500 0 0
Debenture stock, 5 per cent.	650,000 0 0	28,000	678,000 0 0
	2,641,500 0 0	53,000	2,694,500 0 0
Premium capital	208,496 0 0	46,355	254,851 0 0
	2,849,996 0 0	99,355	2,949,351 0 0

No. 4.—REVENUE ACCOUNT.

To Manufacture of gas—			
Coals, including dues, carriage, unloading, and trimming. (See Account No. 9)	£250,557 3 6		
Purification, including £5035 14s. 1d. for labour	10,205 16 8		
Salaries of Engineer, Superintendent, and Officers at works	4,581 4 5		
Wages (carbonizing)	54,107 5 3		
Repairs and maintenance of works and plant; Materials and labour, less £2162 4s. 10d. received for old materials	48,863 17 5		
		£368,315 7 3	
Distribution of gas—			
Repair, maintenance, and renewal of mains and service-pipes, including labour	£11,095 17 6		
Salaries and wages of Officers (including Rental Clerks)	5,451 1 3		
Repairing and renewals of meters and stoves	6,713 3 9		
		24,160 2 6	
Public lamps—lighting and repairing		5,761 12 0	
Rents, rates, and taxes		20,524 1 8	
Management—			
Directors' allowance	£1,750 0 0		
Salaries of Secretary, Accountant, and Clerks	1,865 9 5		
Collectors	5,137 13 6		
Stationery and printing	1,051 1 0		
General charges	3,619 16 6		
Company's Auditors	112 10 0		
		13,536 10 5	
Law charges		883 10 7	
Bad debts		1,198 8 5	
Pensions and workmen's superannuation and sick fund		1,877 14 9	
Gas Referees and Official Auditor		205 15 3	
Leasehold renewal fund		500 0 0	
Total expenditure		£436,963 2 10	
Balance carried to net revenue account (No. 5)		98,497 18 7	
		£535,461 1 5	

By Sale of gas—			
Common gas (per meter)—			
At 2s. 3d. per 1000 cubic feet, Michaelmas	£107,690 18 7		
Christmas	223,134 12 2		
	330,825 10 9		
Public lighting and under contracts (see Statement No. 11)	28,687 16 4		
		£359,513 7 1	
Rental of meters and stoves		10,584 0 7	
Residual products—			
Coke, less £10,376 13s. 3d. for labour, &c.	£116,708 2 4		
Breeze, less £1533 4s. 2d. for labour, &c.	2,371 10 9		
Tar, less £283 3s. 4d. for labour, &c.	25,483 16 1		
Ammoniacal liquor, less £527 1s. 3d. for labour, &c.	21,128 9 9		
		163,691 18 11	
Rents receivable		1,689 1 10	
Transfer fees		32 13 0	
Total receipts		£535,461 1 5	

No. 5.—PROFIT AND LOSS (NET REVENUE) ACCOUNT.

Interest on temporary loan and deposits	£1,295 1 7	Balance from last account	£70,461 14 10
„ debenture stock	16,298 14 2	Reserve fund	48,778 5 2
Amount of award (L. & S. W. R., Nine Elms Station)	6,193 12 0		£119,240 0 0
Balance applicable to dividend on the ordinary stock	94,271 12 3	Less dividend for the half year ended June 30, 1890	119,240 0 0
		Profit on sale of investments	£16,691 16 9
		Half-year's interest on reserve fund	2,668 9 0
		Amount from revenue account (No. 4)	98,497 18 7
		Interest on Bankers' balances	200 15 8
	£118,059 0 0		£118,059 0 0

No. 9.—STATEMENT OF COALS.

Description of Coal.	In Store, June 30, 1890.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, Dec. 31, 1890.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal	32,041	344,916	331,075	252	45,630
Cannel coal	2,026	4,338	4,838	—	1,526
	34,067	349,354	335,913	252	47,156

No. 10.—STATEMENT OF RESIDUAL PRODUCTS.

—	In Store, June 30, 1890.	Made during Half Year.	Used in the Half Year.	Sold in the Half Year.	In Store, Dec. 31, 1890.
Coke—cwt.*	106,083	4,151,919	932,242	2,963,964	361,796
Breeze—yards	4,736	55,280	6,338	46,388	7,290
Tar—gallons	379,019	3,305,760	26,059	3,052,009	607,701
Ammoniacal liquor—butts	3,016	105,015	—	101,998	6,033

*1 cwt. of coke about equals 1 sack of 4 bushels, under Weights and Measures Act, 1878.

No. 11.—STATEMENT OF GAS MADE, SOLD, ETC.

Description of Gas.	Quantity made.	Quantity Sold.			Quantity used on Works, &c.	Total Quantity accounted for.	Quantity not accounted for.	Number of Public Lamps.
		Public Lights (estimated).	Private Lights (per Meter).	Total Quantity Sold.				
	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	Thousands.	
Common	3,369,845	201,367	2,962,915	3,164,282	37,284	3,201,566	168,279	18,292

No. 12.—BALANCE-SHEET.

To Capital—		By Cash at Bankers	£7,320 13 7
Balance—per account No. 3	£140,952 6 9	Amount invested—	
Reserve fund—per account No. 6	150,059 4 4	Reserve fund	£104,046 3 4
Renewal fund—per account No. 7	8,837 15 3	Renewal fund	8,301 1 1
Insurance fund—per account No. 8	12,715 6 3	Insurance fund	2,325 11 3
Net revenue account—for balance, per account No. 5	94,271 12 3		114,672 15 8
Debenture interest for amount due to Dec. 31, 1890	16,298 14 2	Cash in hand for sundry payments	500 0 0
Sundry tradesmen, for amount due for coals, stores, and sundries	38,086 19 5	Stores in hand—	
Workmen's bonus and savings deposited with the Company	10,069 2 8	Coals	£96,216 18 1
Deposits by consumers	26,863 14 5	Coke and breeze	13,086 19 8
Dividend account (outstanding)	1,043 12 3	Tar and ammoniacal liquor	6,138 0 6
Debenture account „	1 18 11	Sundry stores	69,057 0 11
Temporary loan	55,000 0 0		124,498 19 2
		Accounts due to the Company—	
		Gas meter and stove rental, quarter ending Dec. 31, 1890	£243,097 15 1
		Arrears outstanding	829 2 4
			243,926 17 5
		Coke and other residual products	60,373 2 9
		Sundries	2,907 13 1
	£554,200 1 8		£554,200 1 8

THE LEEDS CORPORATION GAS COMMITTEE AND THEIR MEN.

Further Troubles—A Supposed Attempted Outrage.

The Gas Committee of the Leeds Corporation are (says the *Leeds Mercury*) experiencing further trouble with a number of the men in their employ. The present dispute affects some 60 or 70 of the men engaged at New Wortley, all of whom are under notice to leave. These men protest against this action of the Committee on the plea that they are old servants, and that where men have to be dispensed with, it has been the custom to turn away the new hands whenever this course was open. This would seem, remarks our contemporary, in the first instance to be a very plausible position; but, unfortunately for the men, it is one that is altogether destroyed by the rules agreed to after the disturbances last summer, and one that the men at present unaffected by the decision of the Committee would themselves dissent from. The contention of the latter is that, like the persons concerned, they are good workmen, that they are ratepayers, and also that they are members of the Gas Workers' Union, and have no more right to be assailed than those at present affected by the notices. For the case of the Committee it is to be regretted that the men now chiefly concerned happen to be those who were amongst the principal agitators in the disturbances of last summer, since it might be supposed that the action of the Committee is specially directed against those men. That the procedure of the Committee is not dictated by any semblance of vindictiveness is clear from the circumstance that fifty men engaged at the Meadow Lane works have also received notice to leave in exactly the same way. It is expected that the situation will be speedily considered by the Gas Committee. A letter has been received by Mr. Alderman Gilston, the Chairman of the Gas Committee, from Mr. Cockayne, the Secretary of the local branch of the Union, on behalf of the men; and a reply has been sent stating that the Committee will be glad to meet representatives of the men, and hear what they have to say on the subject. Ample time still remains for a consideration of the question before the 16th inst., on which date the notices expire.

Last Friday a discovery was made at the New Wortley works which indicates an endeavour to intimidate the authorities. In the morning what our contemporary describes as an "engine of destruction" was found. This took the form of a fuse and an accompanying explosive, which were contained in an old tin, 9 inches deep and about 5 inches in diameter. These articles were discovered in a part of the works the most easily accessible to a person who wished to deposit them without being detected. This spot adjoins the point where coal is shot down from the overhead railway into position for use by the stokers; and it is declared that the article could not be passed down the shoot without being observed by the person in charge of the tipping work. Besides, there is not a single scratch on the tin, and certainly such might have been looked for if the articles had by any mischance travelled from the colliery from which the coal is supplied. The explosive appears to consist of a charge of compressed powder. It had been wrapped in a thin paper wrapper, part of which had been torn away. While these articles may have been introduced into the works merely in the hope of inducing the Committee to concede whatever demands the men consider it advisable to make, it is palpable that had they been cast into one of the fires during the ordinary process of stoking, there is no saying what injury to life or property might have ensued. The explosive was placed in the hands of the Chief Constable, who has passed it over to Mr. Fairley, the Borough Analyst, to be tested. [At the moment of going to press, we learn that Mr. Fairley has reported it to be merely a blast charge, such as is used in mines.]

A general meeting of the Leeds branch of the Gas Workers' Union was held last Sunday night. The meeting was a private one; but at the close, the following information was communicated to the press: A letter from Mr. Lupton, Secretary to the Gas Committee, and written on behalf of the Chairman, was read to the meeting; and it was unanimously resolved that a deputation, representing the whole of the men, should wait upon the Gas Committee at its meeting on Monday. The following resolution was also passed: "That we, the gas workers of Leeds, in meeting assembled, indignantly repudiate the base insinuation levelled against us by the *Leeds Mercury*, and demand an unconditional withdrawal of the same." A further resolution was carried pledging the Union to stand by the men who have received their notices; and stating that, unless they are reinstated, action will be taken by the whole body of the men.

With regard to the explosive found on the works, it was stated yesterday that the men, as a body, declare they have no knowledge of how it got there; in fact, they indignantly repudiate any connection with the affair, or sympathy with this or any other violent act.

THE DUBLIN CORPORATION AND THE ALLIANCE GAS COMPANY.

Disputed Gas Accounts—The Acquisition of the Public Lighting Plant.

At the Meeting of the Dublin Corporation on Monday last week—the Lord Mayor in the chair—a long discussion took place on the subject of the gas supply of the city, which showed that the relations between the Corporation and the Alliance Gas Company are still far from being amicable.

The first matter to come before the members was a claim by the Company for a sum of £4083 13s. 9d. on account of gas supplied in 1889 and 1890. It was introduced in a letter read by the Town Clerk, who had been served with a writ in an action commenced by the Company to recover the above-named amount. The statement of claim set forth the accounts furnished monthly for one year and eight months, ended Dec. 5 last, at sums amounting to £17,175 4s. 1d., and stated that payments on the accounts to the 5th of October had been made to the amount of £13,670 10s. 4d. apart from the accounts for October and November. The Town Clerk said he understood that the action had arisen in consequence of the Gas Committee claiming to set off the monthly accounts certain deductions which were not admitted by the Company.

Alderman Perry moved that the letter be referred to the Gas Sub-Committee, with directions that a defence should be entered to the writ. He said that it appeared to be a matter of jocularity among some of the members of the Corporation that they should claim the 10 per cent. discount which the Gas Company allowed to many large establishments in the city. This 10 per cent., he thought, had been granted by the Company to the Corporation after a conference which had been held between the Directors and the members of the Sub-Committee. The letters of the Company showed that this concession had been made; and in one letter reference was made to the liberal concession to the Corporation. The amount now sought to be recovered was for this 10 per cent. discount, which he thought the Company intended to allow the Corporation, and also for overcharges for gas amounting to £142. An arrangement was made that all matters in dispute should be referred to an arbitrator; and the Corporation were ready to see one appointed. He held that the move of the Company would not hold water.

Alderman Dillon said there were three items—£740 15s., £930 12s. 4d., and £1050 12s. 6d., together with the united accounts of October, November, and December, cheques for which were sent in the usual way, and returned. Then, on the other hand, the Corporation claimed, on account of discount, £1219 5s. 6d., and £142 for over-consumption.

Mr. Mayne said the Committee had been in the habit of sending cheques to the Company for the amount found to be due, deducting 10 per cent. These cheques had been regularly accepted until a few months ago, and he could not understand why they had since been refused. The sum in dispute was now only £142.

The High Sheriff: If the Company accepted some of these cheques, how is it that the account goes back to April, 1889.

The Lord Mayor: They took them and sent receipts for them without stating what they were; saying they received them on account, and without prejudice.

Mr. O'Meara said one condition of obtaining the 10 per cent. reduction was the purchase of the lighting plant.

Alderman Dillon pointed out that the plant could not be taken over before the price was fixed, and the account went back to April, 1889, when it could not be contended that the plant could be acquired. The only question involved was £142, and surely they were not going to law about that. If the Lord Mayor would take the matter in hand, he was sure he could easily settle the matter.

The Lord Mayor asked if the Company had ever conceded the 10 per cent. in specific words, or merely in general terms. He understood that they only allowed it on gas used for heating purposes or for motive power.

Alderman Dillon said the Directors had, in his hearing, admitted it at the conference.

Eventually the motion was carried, with an addition to the effect that the Lord Mayor be requested to wait upon the Directors, with a view to an amicable settlement of the dispute.

The subject of the purchase of the public lighting plant next came up, on the following motion by the High Sheriff: "That the resolution of Council of the 15th of December, authorizing application for a loan of £14,341 1s. 1d. for the purchase of the lighting plant under the Dublin Improvement Act, be varied or rescinded so far as may be necessary to enable the application to be made under the Public Health Act." This was passed with an *addendum* sanctioning an application to the bank for an advance on this sum, with interest, to pay the amount of the award.

Alderman Perry then moved the adoption of a report of the Special Gas Committee, submitting the proceedings in connection with the purchase from the Company of the public lighting plant. He said the Corporation appointed Mr. R. Hamilton, of Glasgow, as their Arbitrator; the Company appointed Mr. Harry E. Jones, of London; and they agreed on Mr. R. Mitchell, of Edinburgh, as Umpire. The Law Agent recommended that the Corporation did not require any counsel, as it was a matter to be settled by a few common-sense men who knew the value of old iron. But when the members of the Corporation went to the Four Courts they found two eminent Counsel and three or four solicitors opposed to them on behalf of the Company. The Company claimed £16,777, and the Arbitrators awarded £14,341; and the Committee could not but say, having regard to the information before them, that the award was excessive. The report stated:

> The Committee propose, should the Council approve, that the purchase-money for the plant should be provided for by loan to be obtained from the Board of Works; and if the Council approve and direct the carrying out of the sale, they would ask the sanction of the Council for taking the necessary steps to obtain such loan. The annual payment in respect thereof for principal and interest will be £808 9s. 10d., which will decrease yearly. As against this, besides the enormous advantage which will accrue to the public lighting from the Corporation having control of the meters and other fittings, an actual saving of a large amount will be effected on the item of repairs to lamps. These repairs have cost, up to the present, an annual sum of about £900. The Committee expect that on this item alone a saving will be made of nearly £400 a year. The Committee cannot over-estimate the importance of having control of the plant. The control hitherto exercised by the Gas Company has been the cause of very much of the trouble which has arisen between the Company and the Corporation. The Committee trust that in the saving of leakage, in the proper checking of the meters and governors, and in the general supervision of the plant, which could only be effected by its being absolutely under the control of the Corporation, a further very considerable saving will be realized, which will amply compensate for the expenditure. In no place where the meter system is in force are the lamps and governors the property of the suppliers of gas; in every instance they are the property of the local authority.

The cost of public lighting for the year ending April, 1887, was £10,342 1s. 11d.; for the year ending April, 1888, it was £10,225. The Gas Committee was appointed in September, 1888, and the cost of gas for the year ending April, 1889, was £9551, and for the year ending April, 1890, £8425. This showed a saving of £1916 15s. 10d. as against the year prior to the formation of the Committee. Of this sum £412 5s. 10d. only was due to a reduction in the price of gas. This was a remarkable fact, having regard to the previous history of the dealings of the Company and the Corporation, which showed that for several years past a continuous and steady rise had taken place in the cost of public lighting, notwithstanding the continued decrease in the price of gas. The Committee trusted that still further savings

would be effected by the transfer of the plant and the completion of the arrangements the Committee had in progress.

Mr. CUMMINS seconded the motion.

The HIGH SHERIFF criticized the proceedings of the Committee, and complained that he was refused permission to see their minutes when he applied to do so. He said the Committee would not now have reported to the Council had it not been that they wanted this £14,000 to carry out their preposterous bargain with the Company. The Committee claimed that they had effected a saving in the gas account in the past two years of £1900. But £412 of it was a voluntary reduction by the Company granted to all consumers; and the Committee did not disclose the fact that the lighting was curtailed on certain nights in the summer months. He challenged the Committee to produce any evidence as to saving, except the 10 per cent. discount. And what was the cost of effecting this saving? There was an outlay of £14,000 for lamps, £1630 spent in litigation, £3500 for new meters, and £140 for new instruments. The Committee, then, had committed the Council to an uncontrolled expenditure of about £22,000.

Alderman PERRY: We got value for the money.

The HIGH SHERIFF said the 10 per cent. discount, of which the Committee made so much, was actually offered by the Company nine years ago for a three years' contract. It appeared that there was to be no end of litigation, unless his Lordship was able to put an end to it. The only way to stop this contention was for the Special Gas Committee to dissolve, and hand over their functions to the Paving and Lighting Committee.

Mr. MAYNE: Or to the Gas Company. Continuing, he admitted that he had been misled by the valuation put on the lamps by Mr. W. F. Cotton, who since that estimate was made had acquired a great deal of experience. If the Directors of the Company had been as wise at the time of the Four Courts arbitration as they had become since, they would not have parted with the lighting plant for three times the sum awarded. When the plant belonged to the Company, the Corporation had to pay 4s. 6d. a year for keeping every burner in order; and in 13 years they had actually paid £11,000 to the Company for the repair of the plant. They had paid the whole value of it over and over again; and it was time to put a stop to it. Putting together the 10 per cent. discount which the Corporation had obtained and the saving in repairs, there was nearly £2000 a year recoupment for their expenditure of £14,000—seven years' purchase even on this excessive award. When the Corporation owned the plant, they would put the same kind of governors on all the lamps. The High Sherift had complained, as an item of expenditure, that they had given £140 for a testing apparatus. They had the best possible instruments, and had found a very remarkable state of things existing. Dr. Tichborne tested gas at Burgh Quay; but 20-candle gas could be sent to the testing-station, while only 12-candle gas was being supplied to the citizens Not only was that station not connected with the big mains tha supplied the city, but it could not be connected. This was one of the points that induced the Corporation to force the Company into legal proceedings; and the Arbitrators had decided that this station should be done away with; that a proper testing-station should be erected, open to the Corporation as well as to the Gas Company; and that the Corporation should own the lighting plant and put on any burners they pleased. The Company had to pay half of the enormous costs of the arbitration; and the money the Corporation had to pay was very well expended, resulting in a great benefit to the city.

After a few further remarks, the report was adopted by 14 votes to 9.

In a letter which appeared in the *Freeman's Journal* last Wednesday, the Company's Secretary and Manager (Mr. W. F. Cotton) replied to the remarks of Mr. Alderman Dillon. He explained that not only are the three sums mentioned by him—£740, £930, and £1050, the amount of cheques tendered by the Committee in payment of much larger sums—in dispute, but also the accounts for October, November, and December last, in addition to all other accounts furnished from Jan. 5, 1889, the date covered by the award made in December of that year, which settled the full claim made by the Company, with costs. In regard to the statement that there is £142 in dispute for over-consumption, Mr. Cotton said he was at a loss to understand it. If the Alderman was under the impression that the accounts furnished showed a larger consumption than 4 cubic feet per lamp per hour, the Company were prepared to show the contrary; but assuming they had done so, the increased consumption would result in additional light. At the conference to which reference was made, which was held on Oct. 1, 1889, at the Four Courts, it was agreed that in consideration of the Corporation purchasing and taking over the public lighting plant and paying the accounts monthly, within 21 days, the gas was to be supplied at the lowest rate charged to private consumers; this arrangement to have a retrospective effect from the 5th of July, 1889. It was clearly understood that all the accounts due to date were to be immediately settled; otherwise the Directors would not have consented to such a proposition. What had been the result? The Corporation had not closed a single account since Jan. 5, 1889; and it was with difficulty that the Company succeeded in getting a cheque, even on account, some months after that date. It was true that the Directors had, at the request of the Committee, received cheques on account; but not until that body had given an undertaking, in writing, that the acceptance of the cheques was in no way to prejudice the Company's claim to recover the balance due on foot of the accounts.

Northern Coal Trade.—The coal trade of the North of England during the past few days has been a little benefited by the labour troubles at some of the Welsh ports; but the tone of the trade has, on the whole, been easier. Best Northumbrian steam coal is quoted at 11s. 6d. per ton free on board; second kinds being about 1s. cheaper. For gas coals the demand is still large; and the reduced production at some of the collieries gives very full work. The price of Durham gas coals varies more this week; and while 10s. 6d. per ton free on board may be taken as a medium figure, both higher and lower prices are asked. There is no alteration in the price of gas coke; but the output is now rather less than it was a month or six weeks ago.

MANCHESTER CORPORATION GAS SUPPLY.

The Extent of the Undertaking.

Some interesting statistics have recently been prepared for the information of the members of the Manchester Corporation Gas Committee, showing the extent of the area over which gas is supplied by the department, the producing capabilities and value of the works, and other particulars. It is stated that the area includes 12,788 acres within the city, 12,382 acres beyond the city, and 4640 acres beyond the Mersey; the extreme limit of supply being 10 miles. Of the gas distributed 87·7 per cent. is consumed inside the city boundaries, 11·6 per cent. outside those boundaries, and only 0·7 per cent. beyond the Mersey. There are 11,842 lamps inside the city, and 2241 beyond the city limits. These lamps figure in the books as an asset worth £8288. The number of hired meters inside and outside the city is 66,842, and the number of other meters 11,417, or a total of 78,259. The value of the meters let out on hire is set down at £75,386. The total length of main-pipes laid is 677 miles; and of service-pipes, 261¼ miles. The mains are valued at £348,100; and the service-pipes at £57,942. The Gaythorn works cover a space of 8 acres 4456 square yards; and the land is reckoned as being worth £67,848, the buildings £62,611, and the apparatus £64,662, or a total value of £195,121. These works are capable of producing 4,200,000 cubic feet of gas per diem, and have storeage room for 3,370,000 cubic feet. The Rochdale Road works cover 9 acres 339 square yards; and the land is estimated as worth £32,296, the buildings £116,775, and the apparatus £106,772, or a total of £255,843. The producing power of these works is 8,000,000 cubic feet; and they have storeage room for 5,045,000 cubic feet. The works at Bradford Road occupy 51 acres 4777 square yards; and the land is valued at £125,674, the buildings at £96,574, and the apparatus at £178,569—making a total of £400,817. The producing power here is 4,000,000 cubic feet per day; but there is storeage room for 6,800,000 cubic feet. The Droylsden works only occupy 1 acre 519 square yards; the value of the land being estimated at £829, buildings £4772, and apparatus £3105, or a total of £8706. The daily quantity of gas which can be made here only amounts to 168,000 cubic feet, and there is storeage room for 82,000 feet. The Poland Street works cover a space of 3763 square yards; but the value of the land is set down at £1406, the buildings at £1384, and the apparatus at £180, or a total of £2970. The aggregate space occupied by the Corporation for gas manufacturing purposes is thus 71 acres 4174 square yards, of the total estimated value of £228,053. The total value of the buildings is estimated to be £282,116, and of the apparatus £353,288; making a total value for the whole of the property of £863,457. The producing power of the entire works is 16,368,000 cubic feet; and the total storeage capacity about 15,297,000 cubic feet. The amount of gas made during the year 1890 was 2974 million cubic feet.

The Price of Gas

At their last Meeting, the Gas Committee had before them a memorial from the Manchester and Salford Noxious Vapours Abatement Association, in which it was stated that there was a growing impatience on the part of the public at the continued prevalence of the smoke nuisance; that it was generally agreed that one of the most feasible methods of lessening the present excessive pollution of the air by coal smoke was the increased use of gas; and that gas supplied at such prices as were charged at Sheffield, Leeds, Hull, Newcastle-on-Tyne, and some other towns (say, from 1s. 10d. to 2s. per 1000 cubic feet) would enable large numbers of steam users to substitute gas for steam engines. The memorialists said they had good reasons to believe that the manufacture and distribution of gas cost less than 2s. per 1000 cubic feet; and it seemed clear that self-interest alone would not induce steam users to adopt gas-engines extensively, unless gas were reduced in price to this figure. They submitted that the excess price of gas constituted a tax which was most unfair in its incidence upon citizens, inasmuch as gas consumers had to pay for improvements and public works from which all citizens derived benefit. Moreover, the present gas consumers had to pay for works, &c., from which succeeding generations would derive equal benefit. The excessive charge for gas to the consumer relieved the property owner and householder as such of their due share of the public burdens; and the excess was not only a direct tax upon the consumer, but an indirect one upon all citizens, inasmuch as the Corporation might enable them to use gas at no greater cost than coal, and so to save much in labour, while the general comfort would be greatly increased. The memorialists prayed that, for the reasons stated and others, the Committee would favourably consider the suggestion that the price of gas might be reduced to 2s. per 1000 cubic feet—a reform which they believed would have the approval of the great majority of the citizens.

The Profits of the Department.

The statements made in the letter written by Mr. John King, jun. on the subject of the profits of the Gas Department, which we published last week (p. 208), has been commented upon by, among others, Mr. William Thomson. He says that Mr. King addressed himself to two questions. (1) He asserted that the gas-works belonged to the ratepayers, and not to the gas consumers; and (2) he asked whether the profits were excessive and unreasonable? In the gas-works controversy from time to time, there has, remarks Mr. Thomson, been much sophistical reasoning about the distinction between "ratepayer" and "gas consumer." The distinction lies in this, that the person who burns candles and paraffin oil for lighting in Manchester is a ratepayer but not a gas consumer. The person who consumes 5s. worth of gas per annum is a gas consumer, but the amount is so small that he might be relegated to the ranks of the "ratepayers." Then come the men who burn gas to the value of say £5, £50, and £500 per annum respectively. Will Mr. King say where he draws the line between "ratepayer" as opposed to "gas consumer"? Mr. Thomson thinks he is right in saying that, in the name of the ratepayers, there have been extorted from the gas consumer such very handsome annual payments during the last thirty years that it is time now that the gas consumer should protest against the continuance of the present practice. Mr. King, he says, assumes that the ratepayer has

undertaken a risk as regards the gas-works That risk to-day amounts to less than nothing; but for this hypothetical risk, the gas consumer pays about £100,000 per annum, which is called profit. Mr. King does not seem to see any irony in the word "profit" as applied to Manchester gas. One would think if there be a profit that it should belong to the ratepayers; but Mr. King's logic does not stretch to this extent. Being satisfied that the ratepayer should have a profit, he proposes to hand the profit over not to the ratepayer but to the water consumer. Is there any reason, asks Mr. Thomson, why Mr. King's suggestion should not be reversed, and the water consumers be taxed, so that the water shows a profit, and then pay that profit to the Gas Committee for the purpose of reducing the price of gas? The one he contends, is as logical as the other; and the only tenable conclusion is that the making of "profit" by a corporation out of anything supplied to the people they represent, is illogical and ridiculous. Mr. Thomson also doubts the correctness of the last paragraph in Mr. King's letter, to the effect that there is no more gas used after making a reduction in price than there was before; but he admits that it would probably require some time before the consumption increases. Presumably the gas showed no more profit when it was sold at 5s. than it does now at 2s. 6d.; and if reduced to 2s., it would possibly show no profit for a year or two, unless steps were taken to increase the consumption for heating purposes. As to the £1,600,000 upon which Mr. King calculates the 4¾ per cent. interest, the greater part of this, contends Mr. Thomson, actually belongs to the people against whom he is charging it. The gas consumers have paid the ratepayers, whoever they may be, after paying interest and depreciation, about £2,500,000 during the last thirty years. This would suffice to pay for the whole of the gas-works, and leave a balance of about £1,000,000 to the credit of the gas consumer. In other words, the ratepayer should be paying the gas consumer interest on £1,000,000, instead of the consumer paying, as he actually has been doing, profits to the amount of £100,000 per annum.

THE INCREASE IN THE PRICE OF GAS AT NOTTINGHAM.

A memorial was presented at the meeting of the Nottingham Town Council yesterday week, on the subject of the alleged irregularity of procedure on their part in raising the price of gas by 2d. per 1000 cubic feet from June 24 last, whereas the resolution approving of the increase was only passed on July 7. The memorialists stated that they had learnt that two members of the Gas Committee had said, in referring to a previous memorial on the subject, that the Committee had the power of advancing the price, and that they did on June 12 make the increase, and thus gave notice of the coming alteration. The Committee on June 12 recommended that the Council should increase the price from June 24; and on July 7 Alderman Barber proposed in the Council—"That an advance in the price of gas of 2d. per 1000 cubic feet be made, commencing on June 24 last, as recommended in the Committee's report." If, the memorialists argued, the Committee had the power to advance the price, it was surely not necessary to ask the Council to make the increase. A printed notice regarding the increased prices (2s. 6d., 2s. 5d., and 2s. 4d. per 1000 feet) was issued after the Council had, on July 7, resolved that the price of gas should be advanced. The Town Clerk was obviously the proper person to decide whether the Committee in reality raised the price on June 12, at the time they recommended it; and it appeared as self-evident as an axiom or a postulate that, when the legal adviser to the Corporation dated the notice July 7, he virtually decided that the Committee had no more power than the memorialists to advance the price, or otherwise an intimation of the alteration in charges would have been previously published by him, and dated June 12. The memorial also pointed out that the Chairman of the Gas Committee said at the Council meeting on July 7, "the raising of the price of gas must be entirely the act and deed of the Council;" and he further observed, "the Committee do not raise the price." The memorialists were therefore astonished that members of the Committee should claim a power they did not possess; and as it was not believed that the Council would agree with the opinion held by the two Committee men referred to, it was expected, as a matter of right, by the memorialists that the resolution of July 7 would be so amended that the increase did not come into operation prior to Michaelmas, 1890, and also that the many twopences believed to have been wrongfully and illegally demanded and received for the quarter from Midsummer to Michaelmas would be ordered to be deducted from the Christmas or Lady-day accounts. On the proposition of Mr. Bright, seconded by Alderman Barber, the memorial was referred to the Gas Committee; the last-named gentleman remarking that the only thing the Committee could promise was that, when the next alteration in the price of gas (which in all probability would be a reduction) was made, they would take care that it should not come into operation until the following quarter.

The City of London Electric Lighting (Pioneer) Company, Limited, has been formed, under the auspices of the Electric and General Investment Company, Limited, with a capital of £100,000, in £50 shares, to initiate the supply of electricity for public and private lighting, and for motive power and other purposes, within the City of London, and with the intention of forming a larger Company, with adequate capital, to acquire certain undertakings, which will secure to the larger Company the electric lighting of the whole of the City of London.

Lancashire Coal Trade.—A quieter tone prevails in the coal market than has been the case for two months; but most collieries are well engaged in completing orders which had accumulated during the long frost. The better classes of house and gas coal are mostly inquired for. Steam coal is quoted at 10s. 6d. per ton delivered at the Mersey ports. The quotations per ton for other sorts at the pits are: Best house, 12s. to 12s. 6d.; seconds, 10s. 6d. to 11s.; commoner descriptions, 9s. to 9s. 6d.; burgy, 7s. 6d. to 8s.; best slack, 6s. 9d. to 7s. 3d.; and inferior sorts, 5s. to 5s. 6d. per ton.

BRISTOL UNITED GASLIGHT COMPANY.

The Proposed Conversion of the Stock.

Last Wednesday a Special Meeting of the shareholders of the Bristol United Gas Company was held, for the purpose of considering the Bill now before Parliament, for conferring further powers upon them. The Chairman (Mr. J. W. S. Dix) presided; and after the Bill had been read, he moved—"That the Bill for conferring further powers upon the Company be approved, and that the Directors be authorized to proceed with the same, subject to such additions and variations as Parliament may think fit to make." He remarked that the Bill was short and concise. The first point was of very little importance—the alteration of the name of the Company from the Bristol United Gaslight Company to that of the Bristol Gas Company. The next clause of the Bill was more important—the division of the stock. It nominally carried 10 per cent. but it was proposed to double the stock—giving two £100 at 5 per cent. for the present £100 at 10 per cent. There had been a great deal of feeling shown against the Gas Company because it was paying 10 per cent. That very much influenced the strike; and he had even heard business men comment upon the same fact. The public did not seem to realize that the present shareholders did not receive 10 per cent., but only 5 per cent. upon the price they paid for their shares. But if business men could not comprehend it, surely they must forgive the workmen, who did not so well understand commercial matters, for thinking the same, and considering they were entitled to more money. Well, to avoid this difficulty in future, the Directors proposed to split up the stock, upon which they would receive 5 per cent. The present capital of the Company was £511,250, out of which £444,250 had been issued; leaving £67,000 still to be issued. Their borrowing powers were £147,500; and they had already borrowed £130,750, leaving £16,750 still to be borrowed. Their present reserve fund stood at £51,125; and by the Bill they proposed to promote, they would double their capital, making it £1,022,500 at 5 per cent.; and this would enable them to have larger borrowing powers—in fact, to borrow on debenture about £262,888. Money was much cheaper now than when the Company's Act of Parliament was passed; and they believed they would be able to borrow at less than 4 per cent. If they could do so, it would be much better for them as well as for the consumers. He should like it to be understood that the Bill would as much benefit the public at large as the shareholders. At present the reserve stood at £51,125; but if they obtained these further powers, it would be doubled. Mr. Medway seconded the motion, which was carried.

The Gas-Stove Department of the Nelson Corporation.—At the monthly meeting of the Nelson Town Council last Wednesday considerable discussion took place upon the submission of the minutes of the Gas Committee, which contained a resolution appointing a Sub-Committee to inquire into the gas meter and stove systems of corporations, local boards, gas companies, and private dealers; and to ascertain: (1) Whether gas-stoves are used; (2) if used, whether rented or sold; (3) if rented, what percentage is charged for rent; (4) what gas-stoves are used; (5) makers' prices and discounts for twelve months past on gas stoves and meters; (6) cost of maintaining and repairing stoves; and (7) cost of producing gas per 1000 feet in labour. Alderman Astley, Chairman of the Gas Committee, in moving the adoption of the proceedings, said he took the appointment of the Sub-Committee as a court of inquiry into the conduct of the Manager of the gas-works and the Chairman of the Gas Committee. At a recent public meeting, he added, Mr. Greenwood made certain statements with regard to the gas-stove business which he (the speaker) considered damaging to himself, the Committee, and the Manager. The minutes were confirmed. Mr. Greenwood is reported to have said, at the meeting in question, that there was something wrong in the working of the gas-stove department; that they were paying higher prices for stoves than those at which private dealers could get them; and that there was a loss to the town in the purchase of the stoves.

Cookery Lectures at the Glasgow East-End Industrial Exhibition.—On Monday last week, there was commenced, in connection with the East-End Industrial and Fine Art Exhibition, Glasgow, an extensive scheme of cookery lectures and demonstrations by the use of gas. It has been originated by Messrs. H. Darwin and Co., Limited, gas engineers of that city, who, with the hearty co-operation of the Exhibition Executive, have suitably fitted up with their gas-fires, cooking-stoves, &c., a large lecture hall within the Exhibition buildings, and have engaged some of the ablest lady cooks in the kingdom to give the lectures and demonstrations—the lady engaged the first week being Mrs. Hall, of the Edinburgh School of Practical Cookery. There are two lectures and demonstrations daily—high-class cookery in the afternoon, and plain cookery in the evening. The room was crowded on both occasions during the past week; and Messrs. Darwin and Co. and the Executive of the exhibition are to be congratulated on having contributed to give a material impulse to the use of gas in the art and practice of cookery. Dr. Neilson presided at the opening meeting, in his capacity of Convener of the Stoves Department of the Glasgow Corporation Gas Trust, and expatiated on the advantages of gas-stoves generally, and on the special merits of those manufactured by Messrs. Darwin and Co. In conclusion, he bespoke for Mrs. Hall a hearty welcome from the ladies present, and those who might attend subsequent lectures. Before asking this lady to proceed with her first lecture and demonstration, he mentioned a number of interesting statistics by way of showing how rapidly gas heating and cooking appliances were being brought into use in London, Glasgow, and many other parts of the kingdom. As regards Glasgow, he stated that the Gas Trust Stove Department had on hire on May 31 last 6615 stoves, and that by the end of the year the number had risen to 7631. Mrs. Hall then, with the assistance of a young lady, gave her opening lecture, at the close of which a hearty vote of thanks to her was passed. A similar compliment was paid to Mr. Darwin and the gentlemen associated with him in business for the enterprise they had shown in starting the lecture scheme in connection with the exhibition.

PROVINCIAL GAS AND WATER COMPANIES.

During the next few weeks, many Gas and Water Companies in the provinces will be holding their annual and half-yearly meetings; and, as usual, we shall extract the principal features from the various reports of proceedings and financial statements which reach us.

Gas Companies.

The Cambridge Gaslight Company's half-yearly meeting was held last Thursday week. The report submitted by the Directors was a short one; and in it they proposed the payment of dividends at the rates of 10 and 7 per cent. They also mentioned that the 500 £10 shares authorized to be created by the shareholders last October were sold by public auction in November last, and realized £5733. The sum of £2550 had also been raised by mortgage of the undertaking. The Chairman (Mr. C. Balls), in moving the adoption of the report and accounts, referred to the increased cost of labour and materials; and stated that they had failed to earn the maximum dividend by £575. Referring to the recent assessment appeal (see *ante*, p. 160), he said that the Assessment Committee thought it wise to raise the Company's rating by 50 per cent. The Directors did not quite see their way to accept this; and under the advice of their Consulting Engineer (Mr. Hawksley), they laid the matter before Counsel; and under his advice, they resisted the increase. After a consultation, the Committee became a little more reasonable, and reduced the charge to 20 per cent. The Board could not see their way to pay the 20 per cent.; and in the interest of the shareholders, rather than go into Court, they thought it more desirable to go to arbitration. The report was adopted.

The ordinary half-yearly general meeting of the Chester United Gas Company was held last Friday—Mr. F. L. Bagnall in the chair. The accounts submitted showed a balance of £4363 available for division for the six months ending Dec. 31 last; and the Directors recommended the payment of the statutory dividends. In their report the Directors stated that there had been a steady increase in the use of apparatus for heating and cooking by gas; and that this and the severe weather prevailing during the last weeks of the year had led to a largely increased use of gas, resulting in an augmentation of the gas-rental. The returns from the sale of residuals also showed favourably with those for the corresponding half of 1889. These increases, however, had been more than absorbed by large advances in the cost of coals and labour, and also by the reduction made in the price of gas by way of discounts for prompt payment. There was also a slight diminution in the item for meter-rental, owing to a revision of the charges. The Directors expressed their pleasure at finding that the reduction by way of discounts, in the price charged for gas, was appreciated by the consumers, and that they had availed themselves of it very generally. The discounts for the past half year amounted to upwards of £550. The report was adopted; and the dividends recommended were declared. The proceedings closed with a cordial vote of thanks to the Chairman and Directors, as well as to the officers of the Company.

The Directors of the Dorchester Gas and Coke Company, Limited, in the report to be presented to the shareholders to-day, express their pleasure in calling attention to the results of the past half-year's working. The consumption of gas has been more than maintained, owing to the very severe weather; there being an increase of 335,300 cubic feet over the corresponding period. This, with an improved price for residuals, has in the present instance more than made up for the great advance in the price of coal; the result being that there is a balance of £1258 8s. 8d. to the credit of net revenue. The Directors therefore recommend the declaration of a dividend at the usual rate—viz., 11 per cent. on the ordinary shares, and 6 per cent. (less income-tax) on the preference shares. The Directors announce with regret that the Auditor (Mr. W. Livesey) has resigned his position.

The annual meeting of the Durham Gas Company was held last Tuesday. The report presented stated that there had been a considerable increase in the consumption of gas, and a good price had been obtained for the residual products; but the increased income had been more than absorbed by the advance in the cost of coals and higher wages. The profit and loss account showed an available balance of £1896 (after deducting an interim dividend of £2457); but this amount was insufficient to pay the ordinary dividend, and it was recommended that £560 should be withdrawn from the reserve fund for the purpose. The report was adopted, and a dividend of 5 per cent. on the original capital, and 3½ per cent. on the additional capital was declared.

The accounts of the Grantham Gas Company for the six months ending Dec. 31 last show a balance of £2576; and from this dividends of 5 per cent. on the old shares and 3½ per cent. on the new shares have been declared for the half year.

In addressing the shareholders of the Launceston Gas Company at their annual meeting on Monday of last week, the Chairman (Dr. Thompson) stated that they had had an increased profit on the year's trading which was due to a very advantageous contract for coal made in 1889, an increased price realized for coke, and a larger consumption of gas. The Directors found it necessary to raise the price of gas in July last; and in view of the fact that coal was now costing them 6s. per ton more than in 1889, it would be impossible to produce as large a profit in the coming year. He also drew attention to the friction that had arisen during the year between the Directors and the Town Council in reference to the contract for public lighting; and he concluded by stating that the Board were quite prepared, subject to the approval of the shareholders, to dispose of the works to the Council on fair and liberal terms, so that they might acquire for the ratepayers those profits which some persons seemed to begrudge the shareholders, whose capital was invested in the concern. The report was adopted, and a dividend of 6s. per share declared.

The receipts of the Westhoughton Gas Company for the past half year amounted to £1615; and the expenditure to £965—leaving a balance of £650 to be carried to profit and loss account. The Directors recommend a dividend at the rate of 5 per cent. per annum, less income-tax, on the amount of share capital called up.

In the report to be presented to the shareholders of the Weymouth Consumers' Gas Company at their meeting on Thursday next, the Directors state that the accounts for the six months ending Dec. 31 last gave evidence of the continued satisfactory position of the undertaking, and of a successful half-year's working. The exceptional severity of the latter part of the year caused a large demand for gas; the quantity sent out being unprecedented in the history of the Company. The gas-rental consequently shows an improvement of about £373, when compared with the second half of 1889. Against this, however, has to be set the higher price paid for coal and the increased quantity used; amounting together to £394. Coke has yielded a much better price; and the increases of expenditure and of income very nearly neutralize each other—leaving the profit at £2257 18s. 7d. The Directors recommend the payment of a dividend for the half year at the rate of 10 per cent. per annum on the ordinary "A" stock, and of 7 per cent. per annum on the ordinary shares, less income-tax.

The half-yearly report of the Directors of the York United Gaslight Company states that the revenue account shows a balance of £4855 to the credit of profit and loss account. This amount, after being charged with £365, the interest upon money borrowed on mortgage, leaves £4489 available for the half-year's dividend, amounting to £6800—showing a deficiency of £2310. The Directors, however, recommend that the usual dividend be declared, of 5s. per share upon the old shares, and 4s. 6d. per share, or 5 per cent. per annum, upon the new shares. The falling off in the half-year's profit is, the report says, owing to causes which the Board trust are more or less exceptional. Coal has advanced no less than 44 per cent. above the average price paid in the corresponding half of 1889; and other items of expenditure, including wages, lime, iron, &c., have been materially affected with the recent upward movement in trade. The price of gas has not been altered, and remains at from 2s. to 2s. 3d. per 1000 cubic feet—the lowest the Company has ever charged. During the half year some of the residual products realized better prices. The meeting of the Company took place last Thursday, when, the Engineer and Secretary (Mr. Charles Sellers) having read the report, its adoption was moved by Mr. J. F. Taylor, the Chairman, who referred to the exceptional advance which had taken place in the price of coal, and to the effect this had had on the working in the past half year—necessitating a draft to the extent of £2000 upon the reserve fund. Notwithstanding somewhat adverse circumstances, however, the price of gas would not be increased, nor would the dividend be reduced. This would, he thought, be the more satisfactory, as they were an exception to the general rule of gas companies all over the country. He concluded by mentioning that during the past half year the Company had fixed 74 gas fires and stoves, 28 gas-ovens, and a gas washing-machine. The report was adopted and the dividend declared; the proceedings closing with the usual complimentary vote to the Directors.

Water Companies.

The Directors of the Cambridge Water Company submitted, at a meeting of the shareholders a few days ago, a report on the working of the past half year, in which they recommended the declaration of a dividend on the consolidated stock at the rate of 10 per cent. per annum, and on the amount paid on the 1900 shares last issued of 7 per cent. After paying this dividend, with the addition of the amount brought from the previous half year, a balance would remain of £2732. The report was adopted. In order to meet further requirements on capital account, a resolution was also passed, authorizing the Directors to raise on mortgage a sum of £5000, £2500 of which, it was stated, would probably be needed during this half year.

The result of the working of the Cleveland Water Company during the past six months is a disposable balance, including the amount brought forward, of £2681, from which a dividend of 6 per cent. is recommended by the Directors.

The Directors of the Consett Water-Works Company report that the revenue for the past six months amounts to £8581—being nearly £500 in excess of that of the corresponding period of the previous year. The undivided profit stands at £6194; and the Board recommend the payment of a dividend at the rate of 7 per cent. per annum.

An extraordinary meeting of the East Surrey Water Company was held at Redhill on Saturday, the 31st ult., for the purpose (1) of authorizing, under the powers of the East Surrey Water Act, 1885, the raising of additional capital by a further issue of ordinary or preference shares to the amount of £24,000; (2) an increase in the borrowing powers of the Company, by the issue of further debenture stock, to the amount of £6000; and (3) of inviting all the holders of the 4½ per cent. preference shares to convert the same into 5 per cent. preference shares. Mr. E. Easton (Chairman of the Company) presided. Having, in feeling terms, referred to the death, on the previous Tuesday, of their Solicitor, Mr. J. A. Radcliffe, he proposed a resolution authorizing the raising of the £24,000 of additional capital; and it was unanimously agreed to. Two other resolutions were passed covering the second and third objects of the meeting, as above set forth; the Chairman explaining, in regard to the latter, that the object of the Directors was to raise the total preference capital to £50,000, in order to get a quotation on the Stock Exchange. The proceedings closed with a vote of thanks to the Chairman.

The balance to the credit of the revenue account of the Grantham Water Company for the past half year is £3881; and from this a dividend of 5 per cent. has been declared—absorbing £1750, and leaving £2131 to be carried forward.

The results of the working of the South Staffordshire Water Company for the past half year will enable the Directors to pay a dividend at the rate of 3½ per cent., and carry forward £2618, after appropriating a sum of £2000 for the depreciation fund, which will then stand at £4053.

The report of the Weardale and Shildon District Water Company for the past year shows that the net revenue amounted to £25,962, including £2987 brought forward from the preceding year. Deducting the interim dividend amounting to £10,204, and income-tax £503, there remains an undivided profit of £15,254. The Directors recommend the payment of the following dividends: Of 10s. 9·6d. per share on 3511 shares £25 paid, and of 11s. 3d. per share on 17,600 fully-paid shares; making an average dividend for the year of 4¼ per cent. per annum. This will absorb £11,795, and leave to be carried forward an undivided profit of £3458.

The Directors of the York New Water-Works Company, in their half-yearly report, state that they have paid the whole of the expenses and costs relative to their opposition to the Bradford Corporation

(Nidd) Water Bill; and that, with the exception of the small balance standing to the credit of the capital account at the close of the half year, which has been applied to the purpose, these expenses have been met out of revenue. The called-up capital having been now expended, the shareholders are to be asked to authorize the Directors to raise, under the borrowing powers of the Company's Act of 1876, the remaining sum of £5000 on mortgage or debenture, as occasion shall require. The Board recommend that dividends at the rate of 5 per cent. per annum on the preference shares, of 9 per cent. on the ordinary shares, and of £6 6s. per cent. on the new shares be declared for the past half year. At the meeting of the Company last Thursday, the Chairman (Mr. J. F. Taylor) moved the adoption of the report; and the motion was unanimously agreed to. At a special meeting subsequently held, authority was given to the Directors to raise £5000 on mortgage for the general purposes of the undertaking. The proceedings closed with the usual complimentary votes.

THE BOARD OF TRADE RETURNS AS TO AUTHORIZED GAS UNDERTAKINGS.

In the JOURNAL for Dec. 23 last (p. 1292) we gave the principal figures from the above returns for the year ending Dec. 31, 1889, and March 25, 1890—the former relating to the Gas Companies, and the latter to the Local Authorities. The returns form the subject of an interesting article in the *Board of Trade Journal* for the past month, the chief portions of which we reproduce.

Beginning with the amount of money invested in gas undertakings in the United Kingdom at the above-named dates, we find that the 405 companies making returns had a total authorized share and loan capital of £51,747,293, of which £38,207,748 had been paid up and borrowed; and that the 173 local authorities had, on March 25 last, raised £21,669,789 out of the £24,846,431 sanctioned. Consequently, the 578 gas undertakings included in the returns employed £59,877,537 out of an authorized total of £76,593,724. The companies' receipts amounted to £10,778,246; those of the local authorities to £5,067,843—together, £15,846,089. The total expenditure was: Companies, £7,634,605; local authorities, £3,627,578—together, £11,262,183. The following figures relate to the working of the undertakings: The number of tons of coal carbonized by the companies was 6,309,495; the gas production being 64,627,914,489 cubic feet, of which 59,600,303,013 feet were sent through 13,917¼ miles of mains to 1,128,838 consumers and 268,013 public lamps. The local authorities carbonized 3,353,516 tons of coal, and made 33,453,368,830 cubic feet of gas, of which they supplied 30,652,291,701 cubic feet through 7667½ miles of mains to 1,115,267 consumers and 178,867 public lamps. Adding the totals of the two classes of undertakings together, we have: Coal carbonized, 9,663,011 tons; gas made, 98,081,283,319 cubic feet; gas sold, 90,252,594,714 cubic feet; length of mains, 21,584⅝ miles; number of consumers, 2,244,105; number of public lamps, 446,880. Commenting on these figures, the writer points out that the increase over the year 1888-9 was £761,930 in the amount of capital authorized, £805,170 in the amount paid up, £494,099 in revenue, £785,012 in the expenditure, 407,441 in the number of tons of coal carbonized, 3,371,616,079 in the cubic feet of gas made, 3,229,306,009 in the cubic feet of gas sold, 461¼ miles of main, 51,159 consumers, and 12,768 public lamps lighted. Electric lighting does not therefore, he says, appear as yet to have had any perceptible effect upon the progress of the gas industry. Of the total number of authorized gas undertakings in the United Kingdom at the date of the returns, nearly 30 per cent. belong to local authorities. The increase over the previous year was 10, all belonging to companies. The increase over the year 1882, which is the first year for which the returns were issued for the United Kingdom, is 78; the increase in the number belonging to local authorities being 25. The article then proceeds as follows:—

The receipts of the companies averaged 3s. 7·42d. per 1000 cubic feet of gas sold, as compared with 3s. 7·90d. in the previous year, and 3s. 8·52d. in 1887. The receipts of the local authorities averaged 3s. 3·67d., as compared with 3s. 3·12d. in the previous year, and 3s. 3·34d. in the year 1887-8. In some instances local authorities supply gas to the public lamps free of charge; and in Scotland many of them are under statutory obligations to supply gas at cost price, which must be taken into consideration in noting the lower average receipts by them. The expenditure of the companies averaged 2s. 6·74d. per 1000 cubic feet of gas sold, as compared with 2s. 5·65d. in the previous year and 2s. 6·48d. in 1887. The expenditure of the local authorities averaged 2s. 4·40d., as compared with 2s. 3·41d. in the previous year and 2s. 3·67d. in 1887-8. The average expenditure of the local authorities was therefore less than that of the companies; but the latter have only 81 consumers and 19 public lamps per mile of main, as compared with an average of 145 consumers and 23 public lamps per mile of main by the local authorities—the proportions being similar to those shown by the returns of last year. The averages of expenditure show that the tendency to decrease, noticeable in previous returns, has not been maintained, as in each case there has been an increase over the previous year of about 1d. per 1000 cubic feet of gas sold. The next returns will probably show a still further advance in the average expenditure, in view of the increase which has since taken place in the cost of coal and labour. At the same time the average receipts have not increased in proportion to the average expenditure; in fact, in the case of the companies it has decreased by 0·48d., while in the case of the local authorities it has increased by only 0·55d. per 1000 cubic feet of gas sold. Consequently, the gross profit per 1000 cubic feet of gas sold has decreased in the case of the companies by 1·57d., and in that of the local authorities by 0·44d.; the gross profit by the companies being 1s. 0·68d., and by the local authorities 11·27d. In spite, however, of this diminution of profit, the average dividend paid by the companies on their original capital was slightly in excess of that paid in the previous year; the average being £8 11s. 0⅔d., as against £8 10s. 11½d. per cent.

The average make of gas per ton of coal carbonized was 10,242 cubic feet by the companies, and 9975 cubic feet by the local authorities; showing a decrease of 59 and 128 cubic feet respectively. The price of gas to private consumers was reduced as compared with the previous year by about 112 companies and 36 local authorities, exclusive of reductions caused by increased discount allowances in a few cases. The price was raised in about five instances by companies, and in seven instances by local authorities. In the case of seven companies and four local authorities the expenditure exceeded the receipts. Ten companies paid no dividend; and in the case of 36 local authorities the excess of receipts over expenditure was insufficient to provide for the payment of interest, &c.

The returns furnished by the companies show that £32,117,202 of share capital has been paid up, of which £5,205,325, including premiums (£1,563,595), has been raised under the auction clauses. The lowest price charged for gas was 1s. 9d. per 1000 cubic feet, at Plymouth, which enabled the Company, under the operation of the sliding scale, to pay a dividend of 12¼ per cent. The highest price charged was 7s. 6d., at Walton-on-the-Naze. Of the companies, 160 paid a dividend of 10 per cent. on the original capital; and 51 paid dividends varying from 10½ to 17⅜ per cent.—mostly under the operation of the sliding scale. The highest dividends paid under the sliding scale were 16 per cent. by the Harrogate Company and 14⅜ per cent. by the South Metropolitan Company. The Kingston-upon-Hull Company paid a dividend of 17⅜ per cent. (Act of 1821); the Pontypridd Company, 16½ per cent. (6½ being in respect of arrears); and the Warwick Company, 15 per cent., but not under the sliding scale.

The local authorities' returns show that the lowest price charged for gas was 1s. 10d. per 1000 cubic feet, at Leeds, which earned a profit of £796, after payment of interest, &c. The highest price charged was 6s. 3d., at Bethesda, which did not produce sufficient revenue to pay expenditure. The following table gives the places in which a profit exceeding £10,000 was made, after payment of interest, &c., and shows how the profit was applied:—

Town or City.	Net Profit.	Price charged to Private Consumers.	How Profit was applied.
	£		
Birmingham .	70,337	2s. 3d. to 2s. 7d. per 1000 cubic feet, according to consumption. Discount, 5 per cent.	£41,649 to improvement rate, £13,688 to reserve fund, and £15,000 to sinking fund.
Leicester . .	30,237	2s. 4d. per 1000 feet.	£20,237 to borough district fund, and £10,000 to gas-works renewal fund.
Bolton . . .	29,441	3s. 2d. Discount, 6d.	£13,500 in aid of rates, and £15,941 to reserve fund.
Nottingham .	28,198	2s. 2d., 2s. 3d., and 2s. 4d.	Not yet applied.
Bradford* . .	22,819	2s. 3d. Discount, 2½ to 12½ per cent., according to consumption.	In aid of rates.
Belfast . . .	22,197	2s. 9d. Discount, 2½ to 20 per cent., according to consumption.	To depreciation fund, capital account, &c.
Manchester* .	21,994	2s. 6d. per 1000 feet.	Lighting of, and improvements to the city.
Oldham* . .	16,488	2s. 9d., 2s. 11d., and 3s. Discount, 6d.	£6488 in aid of borough rate, £4000 to reserve fund, and £6000 carried forward.
Rochdale* . .	13,576	2s. 11d. Discount, 2d. to 3d., according to consumption.	In aid of borough rates.
Salford . . .	12,968	2s. 5d. and 2s. 6d.	£8103 to relief of rates, and £4865 to depreciation funds.
Burnley. . .	11,339	2s. 6d. Discount, 3d.	£8440 to relief of rates, and £2899 to reserve fund.
Edinburgh and Leith	11,155	3s. 6d. Discount, 2½ and 5 per cent., according to consumption.	Carried forward.

* No charge made for gas supplied to the public lamps.

In all the above cases, except Manchester and Salford, there was an increase in the amount of net profit as compared with the previous year; the increase amounting, in the case of Birmingham, to nearly £30,000. The decrease at Manchester and Salford, which amounted to £28,629 and £24,206 respectively, is no doubt attributable, to some extent, to a reduction in the price charged for gas. At Oldham and Bolton the price charged for gas appears to have been raised; but at all the remaining places it seems to have been the same as in the previous year.

The Bill of the Sunderland and South Shields Water Company.—A special meeting of the Sunderland and South Shields Water Company was held last Friday week, for the purpose of considering and approving of the Bill now before Parliament. The provisions of the Bill were explained in detail by the Company's Solicitor (Mr. Longden). He stated that there was a clause for power to raise £500,000 additional capital by new ordinary shares or stock, which shares would not be of less nominal value than £5 each. Borrowing powers were also applied for to obtain a loan of £125,000. The Chairman (Mr. J. Stokoe) said that their original Act limited the dividend to 10 per cent., the last limited their power in this respect to 7 per cent., and the new Bill would confine them to 5 per cent. The reason for the last limitation was that, according to the Standing Orders of both Houses of Parliament, in any application for new capital on behalf of existing companies, the dividend must be limited to 5 per cent. The idea of Parliament was not so much that they should make money, as to fulfil their obligations to the district to which they had undertaken to supply water; and he had no doubt that, so long as they fulfilled that obligation, they would run no risk of being opposed by any other company. The amount of water which served the public of their district 23 years ago was certainly not sufficient to supply the requirements during the next few years; and it was, therefore, the duty of the Company to anticipate the demands of the district, and put themselves in a position to meet the wants of the inhabitants. The Directors had realized the fact that they must certainly not postpone any longer making an application to Parliament for powers to construct new works. He might also allude to another matter. The Directors, at their meeting on the previous Wednesday, had decided to call in all the capital under the Company's former Acts before raising the new capital proposed in the Bill under consideration. He had no doubt that this would give perfect satisfaction; and he had every confidence that their vote would in consequence be a unanimous one. He then moved that the Bill be appoved of; and this was agreed to.

MESSRS. T. FLETCHER AND CO.'S NEW PREMISES.

The gas engineering industry has made rapid strides during the past few years, especially in the direction of the production of cooking and heating appliances. While the City of London has never been a centre of manufacture in this particular branch of commerce, it has been found to be essential that the latest types of gas-stoves should be exhibited there as early as possible. Among the first to recognize this was the firm of Messrs. T. Fletcher and Co., of Warrington, who some six years ago took premises in Upper Thames Street, whence they removed later on to No. 77, Queen Victoria Street, for the purpose of bringing their appliances under the notice of the Metropolitan public. This depôt was started with but two persons—the present Manager (Mr. J. Miller) and an assistant; but, although the premises were spacious, the business soon outgrew them, notwithstanding that the chief supply of stoves was from the head-quarters of the firm at Warrington, which are under the immediate supervision of the founder of the business—Mr. T. Fletcher, F.C.S., and his partner, Mr. Alfred Clare. As to the extension of the London department, it may be mentioned that the staff now numbers seventeen. In view of this great development of their undertaking, resulting from the largely increased use of the gas cooking and heating and labour-saving appliances with which the name of the firm is associated, it was deemed advisable to move the London depôt into the very heart of the City. A suitable site at the corner of Milk Street, Cheapside, having been secured, a handsome building, eminently fitted for its purpose, has been erected; and it was opened to the public with much appreciation last Thursday. It is from the designs of Mr. Herbert Ford, F.R.I.B.A., of Aldermanbury, and consists of five storeys and a basement. The construction of the frontage is entirely of Portland stone; the carving of the capping of the windows and the dome on the roof being extremely ornamental. This dome it is intended to illuminate in some way, so as to form an attraction. Entering the building at the corner entrance, we find ourselves in a handsome showroom measuring 50 feet by 26 feet, with a frontage of plate glass, in nine panels, measuring 70 feet. From here a view can be obtained by the public of the novelties exhibited within. These include a general assortment of gas fires und ranges, together with gas cooking-stoves, and domestic gas appliances of the latest designs. Altogether, the display is most attractive; and at night it is further enticing by the brilliant illumination afforded by the Incandescent Gas-Light Company's burners, of which there are altogether 60 in the building. The greatest novelties are perhaps the *chef's* cooking-range, which is easily fitted in a frame to a flue. This range is seen from the street in full operation, and attracts considerable attention. Behind the showroom is Mr. Miller's office. A passenger lift has been constructed by Messrs. Waygood and Co., of Dover Street, and by it we descend to the basement, the walls of which are covered by Cliff's white glazed bricks. Here are exhibited a large number of heavy goods; but a special feature is a table covered with iron, and fitted with gas-tubes, allowing any article in the house to be exhibited in operation to visitors. One of Messrs. Fletcher's new perfect combination gas-ranges is shown, which permits of boiling water being circulated in large mansions, in addition to cooking. Another important appliance is the new hotel gas-oven, standing 6 feet high, with which every kind of cooking can be done. Ascending by the lift, we enter the first floor, which is a very fine room, large enough to hold 100 people, to be devoted entirely to cookery lectures. Abundant light is obtained from seven plate-glass windows, over which are fitted patent lever ventilators. These cookery lectures are to be given twice a week; and Messrs. Fletcher expect them to be largely attended. Ascending to the second floor, where there is a ladies' lavatory, fitted by the well-known Mr. Jennings, of Lambeth, we pass to the counting-house, which affords every accommodation for the staff. The third and fourth floors are devoted entirely to the stock, and the packing and despatch of goods. Shelves in the centre and round the walls are loaded with every conceivable article: thus constituting the new premises the largest depôt of gas apparatus in the City of London. With regard to their general construction, it may be mentioned that Messrs. Moreland and Son, of Old Street, St. Luke's, supplied the massive steel girders and other ironwork; and the builders' work was carried out by Messrs. E. Lawrance and Son. The structure as a whole has cost upwards of £4000; the internal fittings entailing an outlay of another £1000. Altogether, Messrs. T. Fletcher and Co. are to be complimented on their advancement in the gas engineering world, especially in the excellence of their general castings, which are so greatly admired. It is to be hoped that the latest example of their enterprise here noticed will be attended by a full measure of success.

The Liverpool Water Supply and the Recent Frost.—Since the frost began in the last week of November, in addition to the repair of leakages from the street mains, more than 12,000 broken lead pipes were taken up or repaired by the Liverpool Corporation water-works officials. The number of houses temporarily deprived of water by the action of the frost is estimated to have been about 20,000.

The Quality of the Metropolitan Water Supply in December.—In his report on the quality of the Metropolitan Water Supply for the month of December last, lately issued, the Official Water Examiner (General A. de Courcy Scott) refers to the concluding portion of the report by Messrs. Crookes, Odling, and Tidy for that month, as given in the JOURNAL for the 27th ult., where they mention that certain samples of the water had an unpleasant smell and taste. General Scott states that in no case were these qualities observable in samples obtained by him at the filters or from the mains. The analyses made for the Government, as well as those of the Companies' chemists, concur, he says, in attributing to the water supply of the month characteristics which, for the season of the year, were quite normal. He adds: "There is no question that the snow which fell on several occasions in the vicinity of the intakes at Hampton during the prevalence of fogs, and in a greater degree that which fell at the sites of filters near London, was contaminated with the smoke suspended in the atmosphere, and that samples collected and melted afforded water which, both by taste and odour, gave distinct evidence of the presence of some of the products of coal combustion."

THE SUPPLY OF FUEL GAS IN PITTSBURGH.

We learn from the *American Manufacturer* that the year which has just closed has witnessed a remarkable advance in the use of artificial gaseous fuel or "fuel gas," as the article has come to be generally known, in contradistinction to natural gas. This increase has been due to two causes, which in a manner are independent of each other, yet which have assisted each other in bringing about the results attained. The first and perhaps more potent cause has been the fact of engineers having observed the great advantages arising from the use of fuel in the gaseous form over that in the solid, which has led to the invention of many forms of machinery for the economical production of gas from the crude forms of solid or liquid fuel. The adoption and trial of these gas producers has taken place to an extent greater perhaps than in any other locality in the city of Pittsburgh, where from various causes the use of natural gas in the mills has in some degree been discontinued. At the present time many of the largest works both in Pittsburgh and outside the district are changing, or have already changed, to the use of fuel gas; the resumption of coal as fuel, if done at all, being looked upon generally as only temporary. With reference to the supply of natural gas, the impression has gained currency that the use of natural gas in this city has been practically abandoned. This is not altogether correct; for even in the mills where the change has been most marked, half are still using the natural fuel. The withdrawal of the supply of gas from the mills has been done simply as business policy on the part of the supplying companies, whose receipts from what are known as private consumers are much larger; these paying a much higher rate for the gas consumed. The supply of natural gas may in time be exhausted; but, judging from the present more than hopeful progress in the manufacture and adoption of fuel gas, the day when the general use of solid fuel shall again obtain is believed to be more remote than ever. Rates for natural gas advanced very considerably during the past year. The Philadelphia Company have shut off the supply of gas from all puddling furnaces formerly supplied by them; though heating furnaces and steam-boilers are still supplied. To private consumers the rates have been raised from 10c. to 15c. net per 1000 cubic feet. The number of consumers of this class supplied by the Philadelphia Company alone now aggregates 27,000; and, as, showing the value placed upon this fuel for domestic use, it is stated that up to the present time the Company named have received but three notices to discontinue supplying gas on account of the advance made in the rates. The amount of gas daily brought into Pittsburgh cannot be accurately determined; but it is estimated at not less than 750 million cubic feet. It is reckoned that the consumption of gas in the 585 puddling furnaces formerly supplied by the Philadelphia Company, now shut off, was 35 million cubic feet per day. The mileage of pipe now in service supplying natural gas in and around Pittsburgh is about 1200; the size of the mains in the field varying from 12 to 36 inches. There are at present 15 companies supplying natural gas in this district, the aggregate capital stock of which is $20,190,000. The value of the gas annually brought into Pittsburgh is estimated at $6,500,000.

THE ELECTRIC LIGHTING SCHEME FOR THE CITY OF LONDON.

Commencement of the Underground Works.

Last Tuesday, a definite step was taken in the direction of providing works for the supply of electricity for lighting the City of London, by the Lord Mayor placing in position the first stone of the main junction-box for the electric conductors at the top of Walbrook. The works now commenced form part of a comprehensive scheme which the Commissioners of Sewers some months ago decided to adopt, and which has been fully described in our columns. It will doubtless be remembered that the City has been divided into three sections. The eastern division comprises the whole of the City east of the Mansion-House; the central division, the part between the Mansion House and St. Paul's Cathedral; the western division, the remainder of the City west of the Mansion House as far as its boundary on the east of the Law Courts. The central and western divisions have been handed over, under contract, to the Brush Electrical Engineering Company; while the eastern division will be lighted (also under contract) by the Laing, Wharton, and Down Construction Syndicate. The contracts made by the Commissioners provide for the lighting of the whole of the streets of the City, partly by arc lamps and partly by incandescent lamps. The contractors for the central and eastern divisions have obtained powers for the supply of electricity to private consumers; and in the western division similar powers are being applied for. According to the present scheme, the streets will be lighted in all by 400 arc lamps of 2000 nominal candle power and 1000 incandescent lamps of varying candle power. It is estimated that the cost to the City, when the work is fuliy completed, will not very much exceed £20,000 per annum; and for this sum the Commissioners anticipate about 20 times the illuminating power at present obtained from gas will be secured. The contracts require that the works for public lighting shall be commenced before the 19th inst.; and the ceremony of last Tuesday consisted in starting the underground works. This commencement comprises the main junction-box, which will be employed for connecting the mains of the two contractors. The object here is to make the systems inter-dependent; so that, in the event of a serious breakdown occurring at either of the generating stations, the electric current will be obtainable from the other station. The Brush generating station will be located on the south side of the river, which the mains will cross by Southwark and Blackfriars bridges; and the station for the eastern division will be on the banks of the river between the Custom House and the Tower of London. At half past one the Chairman (Mr. Frank Green) and members of the Commission of Sewers, with the Directors and officers of the contracting Companies, assembled at the spot selected, which is close to the private entrance to the Mansion House, and received the Lord Mayor and Sheriffs. The stone having been laid with the usual formalities, the parties (with the exception of his Lordship) proceeded to the Cannon Street Hotel, where luncheon was served.

ELECTRIC LIGHTING AT BIRMINGHAM.

The Birmingham City Council, at their meeting last Tuesday, had before them a report by the Public Works Committee, which dealt, among other matters, with the application to the Board of Trade of the Birmingham Electric Supply Company. In moving the adoption of a recommendation that the Council consent to the application, subject to the insertion of clauses giving effect to various alterations proposed by the Committee, Mr. Lawley Parker said that the Order was for the purpose of obtaining certain small extensions of the area included in the Order of 1889. The object of including these supplementary areas was that they would give more convenient access to the properties which the Company were proposing to light, and with less disturbance of important streets for the laying of mains, &c. Alderman Pollack, in seconding the resolution, said that the additions and alterations proposed were within reasonable limits; and no facilities should be refused to the Company to carry out their scheme, as long as they were no less to the advantage of the ratepayers than they were to that of the shareholders. It was to the public advantage to test how far an efficient supply of electricity could be given at a moderate cost. Much as he was interested in the success of the Gas Department, he should be sorry to see that the city was behindhand in adopting innovations which marked a progress in utilizing the forces of Nature. Electric lighting had up to a recent date been more rapidly developed on the Continent of Europe than in England. How far it had paid the undertakers, he could not say; but abroad the price of gas was much higher than here, and the relative price of electricity lower. During the last two years, however, and especially during the last twelve months, there had been a very rapid development of the supply of electricity in England, and more particularly in London. It would soon be a matter of grave consideration for corporations, owning gas-works or not, whether they should not be the suppliers of electricity in their respective towns. It was at present a matter of doubt, and at all events he could not say positively that electric-lighting undertakings were, and especially that they would be, a financial success. He felt certain that in this country the electric light would always be dearer than gas; and that the supply and use of gas could be so improved as to hold its own against electricity, both as an illuminant and in some respects as a motive power. Alderman Avery asked whether giving their consent to the present proposals of the Company would not injuriously affect the possibility of the Council becoming at some future time the authority for the supply of electricity in the city. Mr. Lancaster expressed the belief that the time would come when the electric light would be cheaper than gas. They had already given the finest plum they possessed to the Company; and now they proposed to give them half as much again, without restricting their powers in any way. He believed that it would become the duty of the Corporation to take up the supply of electricity. Mr. Parker said that the last speaker was altogether wrong in saying that they proposed to increase the area to be supplied to the extent of at least half as much as was originally granted. The recommendation was approved.

MANCHESTER CORPORATION WATER SUPPLY.

The Finances of the Department.

At the Meeting of the Manchester City Council last Wednesday—the Mayor (Mr. Alderman Mark) presiding—the minutes presented by the Water Committee contained a resolution recommending the Council to ask the Local Government Board for a Provisional Order in the present session of Parliament to repeal, alter, or amend the provisions of various Local Acts relating to the Corporation water-works. Sir John Harwood, Chairman of the Water-Works Committee, said that, at the last meeting of the Council, he intimated that they were trying to induce the Local Government Board to make some modification in regard to the money they were paying for the Longdendale works. He believed he stated that the cost of these works was £3,136,000, and that £820,000 had been paid back. Now, in consideration of the Corporation having reduced the debt to such an extent, the Local Government Board had promised to do their best to induce the Government to allow the Council to alter the mode of payment. He would ask the members to keep an open mind until the next meeting of the Council; and he thought that then they would be convinced that the mode suggested by the Committee for meeting the deficit on the water account was the best. What they had been trying to do was what Birmingham had done; but neither Manchester nor any other town would be permitted in the future to consolidate its debt and interest funds. The Local Government Board, however, were prepared to recommend the Government to allow the Council to alter the existing basis for the repayment of these moneys. At present they were paying £36,000 a year on account of the Longdendale sinking fund. Year by year as they paid off the debt, the interest diminished, and what was now proposed was to equalize the payment of interest. The amount to be paid in the end would be the same; but the Council would be relieved for the next twelve or fifteen years to the extent of about £7500 per annum. So that instead of having only £12,000 towards the £50,000 per annum they were short of, they would under this new arrangement have £19,500. In fifteen years they would, of course, have to pay more interest than would have been the case if the present arrangement had continued; but it was only temporary relief they wanted. This was a matter of much importance; and unless it was passed that day, they would not be able to carry the matter through this year. At the next meeting, the Committee hoped to be able to put into the hands of the Council full information as to how it was proposed to meet their engagements with regard to the Thirlmere works. He was glad to say that there had been an increase of revenue through the frost amounting to about £7000. The resolution was carried.

W. Tice and Co., Limited.—This Company has been formed with a capital of £5000, in £1 shares, to acquire the business of Mr. W. Tice, gas engineer, of No. 9, Carteret Street, Westminster.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

Several questions connected with the Edinburgh Gas Supply were before the Town Council last Tuesday. One had reference to the quality of the gas from the Edinburgh works, which was reported to have been of an illuminating power of 18·70 candles on Jan. 19, and 27·6 candles on Jan. 27. Mr. Robertson called attention to this, and said that in the part of the town in which he lived, they could hardly see with the gas as at present supplied. He believed the Gas Commissioners were bound to supply gas of not less than 20-candle power; and he considered the matter required immediate attention. The Lord Provost thought there was probably no need for any discussion on the subject. In all likelihood this state of matters was accounted for by the railway strike, from which everybody had been more or less suffering for the last six weeks. He had no doubt the Commissioners had had to take such coal as they could get under the circumstances; and he thought they ought to be grateful to the North British Railway Company that they had taken pains to keep them supplied with coal. His lordship also believed that credit was due to the officials of the Gas Commission, who had made such arrangements as had prevented the city being landed in darkness, which might very well have been the case on more than one occasion. Messrs. Crichton and Hogg then gave notice of the following motion—"That it be remitted to the Lord Provost's Committee to inquire into the quality of the gas supplied by the Gas Commissioners, and to report." The next item was election business. The Law Committee reported that Mr. P. L. Henderson, who had been unseated in the Town Council, was still entitled to hold his seat on the Gas Commission. It was reported, however, that Mr. Henderson had resigned his position as a Commissioner. The Council then proceeded to fill up the three vacancies on the Gas Commission, caused by the retirement of Treasurer Clapperton, Mr. Hay, and Mr. Macnaughton. The last-named gentleman was not re-elected; the three appointed being Messrs. Colston, Pollard, and Mackenzie. Messrs. Colston and Pollard are both old members of the Commission.

The Corporation of Edinburgh have lodged answers to the objections by the Corporation of Leith to the proposal to introduce electric lighting into Edinburgh. The answers state that clause 62 is merely a permissive clause, giving powers, if it should be so agreed, to the Gas Commissioners, as well as to any company or person to take a transfer of the powers of the Corporation for the purpose of carrying out the power to supply Edinburgh. The Gas Commissioners may not think fit to accept such a transfer; and no power is proposed to be taken in the Order requiring them to do so. The Corporation are prepared to consent to a provision being inserted to meet these objections, that the Gas Commissioners should not be entitled to accept any transfer of the powers of the Corporation under the Order, except by a vote of at least three-fourths of the Gas Commissioners, and except with consent of the Corporations of Edinburgh and Leith. These answers do not touch the very serious objection of the Corporation of Leith, that injury may be done to the gas undertaking, of which the Corporations are joint proprietors, to the prejudice of the ratepayers of Leith.

The Dundee Gas Commission last Wednesday approved of the proposal of their Engineer (Mr. J. M'Crae) to remove two antiquated benches of retorts, and to replace them by one bench of 96 retorts, at a cost of £1800. The new bench, Mr. M'Crae explained, would be constructed on the same principle as those last erected in the works, which had already given satisfactory results.

A Sub-Committee of the Aberdeen Corporation Gas Committee last Tuesday gave instructions to Mr. Smith, the Gas Manager, to report on the cost of laying down electric lighting plant within the area sanctioned by the Provisional Order obtained last year, and also to procure from three of the best electrical engineers in London estimates of the cost at which they would be willing to supply the light. It will be very interesting to observe Mr. Smith's selection of the "three best" electric lighting engineers in London.

Representatives of certain Scotch burghs met here on Wednesday to consider the report of the Select Committee of the House of Commons on the question of the valuation and rating of water-works; and they resolved to memorialize the Lord Advocate in favour of a Bill on the lines of the Select Committee's recommendation. It is announced that the Dundee Water Commission have dropped the clause in their Bill of this session, which proposes to alter the incidence of taxation. This has been done ostensibly because of threatened opposition of rural parishes; but doubtless in reality because of the prospect of legislation on the subject of a wider nature.

The Dundee Water Commission met last Thursday to consider the question of the filling up of the post of Water Engineer and Manager, vacant by the transference of Mr. J. Watson to Bradford. It was recommended by the Works Committee that Mr. G. S. Baxter, an assistant who has been for nearly ten years in Mr. Watson's office, should be appointed interim Engineer and Manager at a salary of £450; and that the post should not be permanently filled up for six months. This gave rise to a good deal of cavilling; there being an evident suspicion that the intention of the Committee is to give the appointment in the end to Mr. Baxter. There really was no objection to the promotion of an official who has served the Commission well; the only argument stated being an insinuation that, to promote a man from £80 a year to £450, was not good policy. I am afraid the objectors were in reality speaking for another candidate; it being notorious that Bailie M'Culloch, one of their own number, who had resigned his seat for the purpose of becoming a candidate, was canvassing for it. There is therefore the greater satisfaction in being able to state that the Commission adopted the recommendation of the Committee. After the decision was known, Bailie M'Culloch seems to have realized that his candidature was no longer feasible; for he at once repaired to the Clerk and withdrew his resignation.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

When the Glasgow Corporation Gas Committee's minutes were up for consideration at the monthly meeting of the Town Council on Thursday, ex-Bailie Ure, Convener of the Sub-Committee on Works,

explained the steps that had been taken to determine the cause of the explosion of No. 2 gasholder at the Dawsholm works, which pointed, after the fullest investigation, to malicious mischief. Colonel Ford, the Government inspector under the Explosives Acts, had also examined the holders, and had experimented thoroughly with explosives on plates similar to those in the crown of the exploded holder. While he had no doubt that they would get the result of the experiments, he scarcely expected that they would get the details as to how Colonel Ford had arrived at his conclusion. Their own experts went on the same lines, as they did not want to teach people how to explode gasholders. He (the Convener) had hoped that the investigation would have shown that there had been some flaw in the construction of the exploded holder, or some fault in its action; but, unfortunately, it turned out to be a malicious act. He thought that the fact that the lighting of the city had not been interfered with, spoke volumes for the management of the gas-works; and he hoped that the perpetrators of the dastardly act would be brought to justice. Mr. Ure went on further to explain that, during the past four months there had been an increase of 16½ per cent. in the consumption of gas. A large part of the increase had taken place in the day consumption; thus showing that gas engines and stoves had greatly increased in number. The Gas Committee, he remarked, had sent out specifications for the duplication of the retort-house at the Tradeston Gas-Works.

At the same meeting of the Town Council, a discussion arose on the question of apportioning the expenses connected with the Boundaries Commission of Inquiry, held some time ago. It had transpired that it had been proposed in the allocation of the expenses connected with that inquiry, and with the subsequent parliamentary proceedings arising out of it, to charge a sum of £3000 to the Gas Department, at which Mr. M'Laren, the Convener of the Gas Finance Sub-Committee, took strong exception. Mr. Simons, another member of the Gas Committee, was even stronger in his objection to the proposed charge. The Town Clerk (Sir James Marwick) was unwilling that the question should be raised and discussed in an open meeting of the Council; and the matter was ultimately allowed to drop without any decision whatever being given on it.

Yesterday afternoon the Greenock Police Board had under their consideration a report from the Gas Committee regarding the proposal to erect another gasholder at the Inchgreen works. Councillor Bell, the Vice-Convener of the Gas Committee, explained that the insufficiency of the present storeage accommodation for the large quantity of gas manufactured since the establishment of the works in 1873, had been gradually increasing so as to render the extra holder capacity that had now been proposed a positive necessity. He moved that offers be taken for the new holder and accepted; and that the Gas Committee be empowered to carry out all the details. After giving the matter very careful consideration, and hearing explanations from the Gas Manager (Mr. Samuel Stewart), the Police Board authorized the work to be proceeded with, so as to be done during the summer months, and the holder be in readiness for next year's working. The holder is likely to cost between £5000 and £6000; and the tank for it is already prepared. Since 1881 the gas consumption has increased from 166 million cubic feet to 204 millions last year.

The Glasgow pig-iron market has been much stronger this week, Scotch warrants fluctuated between 46s. 4d. per ton on Monday, and 47s. 3½d. yesterday afternoon, when there were sellers at that quotation. Hardly any business has been done during the week in hematite and Cleveland warrant iron. It seems that there is now no doubt that some of the Scotch blast furnaces will shortly be blown in again; indeed, it is said that two of the Eglinton Company's furnaces have been relit, and that other two are in a forward state of preparation for being again put in blast.

There is still much restriction in the coal trade of Lanarkshire and the West of Scotland; but matters are not nearly so bad as they were in the early part of last month. Much of the difficulty now is connected with the short supply of waggons, as merchants' and coal-masters' private trucks have got hopelessly mixed through the railway strike. Prices have considerably dropped in every direction; and they are now much nearer their normal level. Main coal is quoted at 9s. 3d. per ton f.o.b.; and splint, at 9s. 6d. to 10s. per ton.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Feb.* 7.

Sulphate of Ammonia.—A large business has been done; and values are enhanced further. Both dealers and consumers have participated in these buying operations; and consequently £11 has been obtainable both here and at Hull. The principal orders have been for American, Spanish, and French account; while Germany, although sending inquiries, persistently abstains from buying, in consequence of the higher prices on this side, so contrary to the anticipations of the consumers in that country. That they will have to purchase presently, seems to leave little doubt. There has been a full supply of parcels during the week; and it is a satisfactory feature to note that nevertheless prices have hardened. The market seems fairly cleared to-day; and although some second-hand parcels appear to have changed hands at a little below £11, this cannot be taken as an indication of a weaker market, and the movements of the dealers point to their requirements being far from satisfied. The nitrate market is entirely without change; the very heavy arrivals precluding any improvement in values.

LONDON, *Feb.* 7.

Tar Products.—Though 50 per cent. benzol is weak, and not too ready of sale, 90 per cent. on the other hand, especially for spot delivery, is in urgent request—4s. 9d. being freely offered, whilst it is just possible even higher prices will be paid for prime quality. The presence in some benzols of carbon bisulphide, thiophene, and (in some instances) mineral spirit, is seriously being taken up by buyers at the higher prices; and it looks as if the recent advent of shale oils, for fortifying the illuminating quality of gas, may seriously affect the value of tar produced from it. Tar distillers will, therefore, be wise to carefully analyze the material they are dealing with, if they wish to retain their reputation for colour-producing benzole. Pitch is in fair request; while common oils are moving off a little better. Carbolic keeps dull; but large sales in anthracene are reported at prices mentioned below. Stocks of the latter article appear to be low; and it is not unlikely higher prices may be seen. Prices are: Tar, 29s. to 32s. Pitch, London, 35s. 6d.; country, 33s. 6d. Benzol, 90 per cent., 4s. 9d.; 50 per cent., 3s. 5d. Toluol, 2s. Solvent naphtha, 1s. 9d. Crude naphtha, 1s. 8d. Creosote, 2¼d. Heavy oil, 2¾d. Crude carbolic, 60's, 1s. 6d. Cresol, 9d. Anthracene, "A" quality (30 per cent.), 1s. 3½d.; "B" quality, 1s.

Sulphate of Ammonia.—A good deal more activity characterizes this article; and large business is reported as having been entered into during the week at £10 15s. for spot, and £11 for forward delivery. The gratuitous attempts to depress this article, by some dealers, should be carefully discounted by manufacturers. Important new outlets for the article continue to crop up; and although the low price of nitrate may affect the German demand for sulphate, ammonia makers need have no fear but that all they produce will be required. The article is likely to be dearer in the course of a few weeks. Ammoniacal liquor is marked 6s. to 7s. 9d., according to strength and position.

The Quality of the Gas at Portsmouth.—At the meeting of the Portsmouth Town Council last month, allusion was made to the fact that on four occasions the illuminating power of the gas supplied by the Portsea Island Gas Company had not been up to the standard; and instructions were given to the Finance Committee to sue for penalties on the next occurrence of default in this respect. At the meeting of the Council last Tuesday, the Gas Examiner presented his report for the quarter ending Dec. 31, 1890, in which it was stated that he had made 108 tests of the illuminating power of the Company's gas; and, with the four exceptions mentioned, he had never found it had been below the standard—the average being 14·55 candles. With regard to purity, the sulphur compounds averaged 6·84 grains, and the ammonia 0·57 grain per 100 cubic feet; and sulphuretted hydrogen was never present. It should be mentioned that the tests are taken at the Town Hall, which is about a mile from the works.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 213.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	10 Oct.	10½	Alliance & Dublin 10 p. c.	10	16—17	..	6 3 6
100,000	10	,,	7½	Do. 7 p. c.	10	12—13	..	5 15 6
300,000	100	2 Jan.	5	Australian (Sydney) 5 % Deb.	100	105—107	..	4 13 5
100,000	20	27 Nov.	8	Bahia, Limited	20	16—18	..	8 17 10
200,000	5	13 Nov.	7½	Bombay, Limited	5	6¾—7¼	..	5 3 5
40,000	5	,,	7½	Do. New	4	5—5¼	..	5 9 1
380,000	Stck.	14 Aug.	12½	Brentford Consolidated	100	212—217	..	5 12 11
125,000	,,	,,	9½	Do. New	100	155—160	..	5 15 7
220,000	20	11 Sept.	11½	Brighton & Hove Original	20	40—42	..	5 9 6
320,000	20	28 Mar.	11½	British	20	43—45	..	5 0 0
50,000	10	11 Sept.	11	Bromley, Ordinary 10 p. c.	10	18—20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13—14	..	5 14 3
328,750	10	13 Nov.	6	Buenos Ayres (New) Limited	10	10½—11½	..	5 4 4
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	101—104	..	5 15 6
150,000	20	14 Aug.	8	Cagliari, Limited	20	26—28	..	5 14 3
550,000	Stck.	10 Oct.	13½	Commercial, Old Stock	100	250—254	..	5 8 3
130,000	,,	,,	10½	Do. New do.	100	198—203	..	5 5 11
130,000	,,	30 Dec.	4½	Do. 4½ p. c. Deb. do.	100	117···122	..	3 13 9
557,320	20	30 Dec.	13	Continental Union, Limited	20	47—49	..	5 6 2
242,680	20	,,	13	Do. New '69 & '72	14	32¾—33½	..	5 8 5
200,000	20	,,	10	Do. 7 p. c. Perf.	20	37—39	..	5 2 6
75,000	Stck.	25 Sept.	10	Crystal Palace District	100	195—205	..	4 17 7
486,090	10	28 Jan.	4†	European, Limited	10	18½-19½*	..	—
354,060	10	,,	4†	Do. Partly paid	7½	13—14*	..	—
5,470,630	Stck.	14 Aug.	13	Gaslight & Coke, A, Ordinary	100	240—244	+2½	5 6 6
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	98—101	..	3 19 3
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	251—256	..	3 18 1
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	120—125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	177—182	..	4 2 5
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	164—168	..	4 3 4
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	250—255	..	3 18 5
476,000	,,	—	—	Do. K, 6 p. c. Prf.	100	150—155	..	3 17 5
1,061,150	,,	12 Dec.	4	Do. 4 p. c. Deb. Stk.	100	113—118	..	3 7 10
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	122—126	..	3 11 5
908,000	,,	,,	6	Do. 6 p. c. do	100	163—167	+1	3 11 10
3,800,000	Stck.	13 Nov.	12	Imperial Continental	100	224—228	−1½	5 5 3
75,000	5	12 Dec.	6	Malta & Mediterranean, Ltd.	5	5—5¼	..	5 9 1
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p. c. Deb.	100	111—114	..	4 7 9
541,920	20	27 Nov.	6¼	Monte Video, Limited	20	18—19	..	6 16 10
150,000	5	27 Nov	10	Oriental, Limited	5	8¾—9¼	..	5 8 1
60,000	5	25 Sept.	7	Ottoman, Limited	5	5—5¼	..	6 7 3
166,870	10	16 July	4	Pará Limited	10	3—4	..	110 0 0
420,000	100	3 Nov.	6	People's Gas of Chicago—1st Mtg. Bds.	100	95—100	..	6 0 0
500,000	100	1 Dec.	16	2nd Do.	100	93—98	..	6 2 5
150,000	10	10 Oct.	10	San Paulo, Limited	10	16—17	..	5 17 8
500,000	Stck.	28 Aug.	15¼a	South Metropolitan, A Stock	100	282—287	..	5 8 0
1,350,000	,,	,,	12a	Do. B do.	100	230—235	..	5 2 1
166,500	,,	,,	13a	Do. C do.	100	235—245	..	5 6 1
678,000	,,	30 Dec.	5	Do. 5 p. c. Deb. Stk.	100	140—145	..	3 9 0
60,000	5	11 Sept.	11½	Tottenham & Edm'nton, Orig.	5	11—13	..	4 8 5
				WATER COMPANIES.				
729,221	Stck.	30 Dec.	10	Chelsea, Ordinary	100	269—274	..	3 13 0
1,720,560	Stck.	10 Oct.	7½	East London, Ordinary	100	216—221	..	3 7 10
544,440	,,	30 Dec.	4½	Do. 4½ p. c. Deb. Stk.	100	140—145	..	3 2 0
700,000	50	12 Dec.	9	Grand Junction	50	120—125	..	3 12 0
708,000	Stck.	14 Aug.	10½	Kent	100	276—281	+2	3 14 8
1,043,800	100	30 Dec.	9½	Lambeth, 10 p. c. max.	100	250—255	+2	3 14 6
406,200	100	,,	7½	Do. 7½ p. c. max.	100	197—202	+2	3 14 3
260,000	Stck.	25 Sept.	4	Do. 4 p. c. Deb. Stk.	100	121—126	..	3 3 6
500,000	100	14 Aug.	12½	New River, New Shares	100	360—365	..	3 6 5
1,000,000	Stck.	28 Jan.	4	Do. 4 p. c. Deb. Stk	100	123-126*	..	3 3 6
902,300	Stck.	12 Dec.	7	S'thwk & V'xhall, 10 p. c. max.	100	175—180	..	3 17 9
126,500	100	,,	7	Do. 7½ p. c. do.	100	167—172	..	4 1 4
1,155,066	Stck	12 Dec.	10	West Middlesex	100	264—269	+1	3 14 4
						*Ex div.		

† Interim dividend. a Next dividend will be at this rate.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams:
"GWYNNEGRAM LONDON."

TELEPHONE No. 2698.

GWYNNE & CO.,

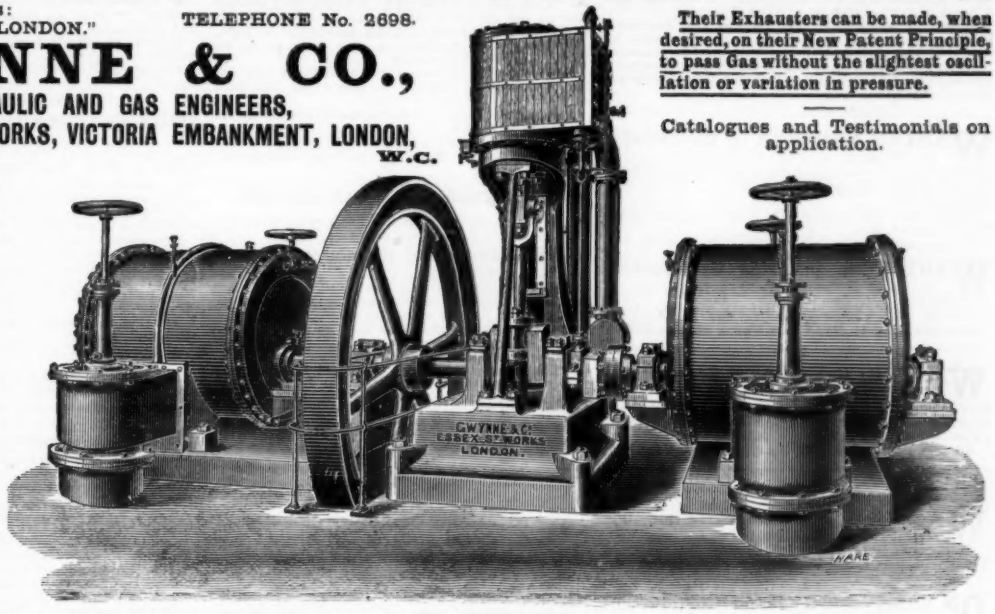
HYDRAULIC AND GAS ENGINEERS,
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co. for Gas Exhausters, &c.

They have completed Exhausters to the extent of 29,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

Catalogues and Testimonials on application.

Exhausting Machinery at Fulham and Bromley Gas-Works—each set passing 400,000 cub. ft. per hour, drawing 14 miles distant from Beckton.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAY.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH. Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.

Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEAR DALKEITH, } SCOTLAND.

SADLER AND CO., LIMITED, MIDDLESBROUGH; ULVERSTON (BARROW); PORTSMOUTH; CARLTON; STOCKTON; 85, Gracechurch Street, LONDON; 70, Wellington Street, GLASGOW; 58, Fountain Street, MANCHESTER; and 96, Reade Street, NEW YORK. Tar Distillers, Manufacturers of all TAR PRODUCTS, ALIZARINE and other TAR COLOURS, BICHROMES, OXALIC ACID, ALKALIES, LIQUOR AMMONIA, AMMONIA SULPHATE, &c.

Head Office: MIDDLESBROUGH. Correspondence invited.

WANTED, at the end of the Month, a steady, competent Man, as WORKING MANAGER of small Works in the Midlands. Make about 6 millions. Help both Summer and Winter. Abstainer, with small or no family, preferred. Able to read and fix Meters. References required. Wages about 21s. per week, with House, Firing, and Gas.

Address No. 1905, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Man experienced in the Manufacture of Salts of Ammonia other than Sulphate.

Apply, by letter, stating previous engagements, to No. 1903, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO GAS STOKERS.

WANTED, by the Cromer Gas Company a steady MAN for Night duty. Wages, 24s. Permanent employment. References required.

Apply, stating age, &c., to the SECRETARY, Gas Company, CROMER.

WANTED, by the Shotley Bridge and Consett District Gas Company, a practical WORKING FOREMAN to lay Mains and Services, fix Meters, and do general outside Work. One accustomed to the routine of a Gas-Works preferred. Wages 35s. per week.

Applications, with testimonials to be sent to the undersigned not later than the 28th inst. The person selected will be required to enter on his duties on or about March 31.

M. RICHLEY,
Secretary.

Shotley Bridge, Feb. 6, 1891.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.

Postal Address: 1, WHITTINGTON AVENUE, E.C.
Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.

*** See Advertisement p. 278 of this week's issue.

Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.

First-Class Award, Melbourne Exhibition, 1889, for WET AND DRY GAS-METERS, STATION METERS, AND GOVERNORS, PRESSURE-GAUGES, STREET LAMPS AND PILLARS, &c.

Telegraphic Address: "Braddock, Oldham."

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 223.

Inquiries should be addressed to THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED, 86-88A, LEADENHALL STREET, E.C.

GAS LAUNDRY LECTURES.

ARRANGEMENTS with Gas Companies for SPRING AND SUMMER DEMONSTRATIONS now being made. The exhibits include Greenall's Gas Washers, Davis's Gas Irons and Dryers, Glover's Gas-Ironing Machines, &c.

For terms, apply to MRS. BURDETT, Laundry Instructress, 32, Melford Road, FOREST HILL.

NOTE.—Orders for 47 machines were obtained in two days for the Wandsworth Gas Company.

A Chemist of a large Gas Company has a vacancy for an ASSISTANT PUPIL. Moderate Premium.

Apply, by letter, to No. 1906, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Good Stoker used to Shovel Charging, and thoroughly acquainted with the routine of a Gas-Works. Wages 25s. per week. References and testimonials required.

Apply, stating age, to the MANAGER, Gas-Works, LEATHERHEAD.

MAIN AND SERVICE LAYER.

WANTED, at once at the Reading Gas- Works, a thoroughly experienced and steady MAN (able to control a gang of Men). Permanent Situation.

Apply to the ENGINEER, stating age, experience, wages required, &c.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

BENTLEY & CO.

MANCHESTER ELECTRICAL STORES.

FOR Batteries, Bells, Wires, and Special Electrical Apparatus, address the best house

17, NEWTON STREET, PICCADILLY, MANCHESTER.

TAR and Liquor wanted.

BROTHERTON AND CO., Commercial Buildings LEEDS.

EXTRACT from the Harrogate Gas Company's Report, dated the 5th of February, 1890: Coal consumed, 8600 tons. Gas made, 92,880,000 feet; ditto sold, 84,880,000 feet; ditto unaccounted for, 8,000,000 feet; quantity made per ton, 10,800 feet; ditto sold, 9869 feet. Illuminating Power, 16·1 candles. Coals used, Brancepeth. Owners, Strakers and Love, Newcastle-on-Tyne; who have also Brandon Hutton Seam Unscreened Gas Coal. Analysis, 10,500 cubic feet per ton; Illuminating Power, 16·2 candles.

ABERDEEN CORPORATION GAS.

WANTED, by the Town Council of Aberdeen, a SUPERINTENDENT for the Main and Service Pipe and Meter Department.

Candidates must have had experience in Laying Main and Service Pipes, Inspection, Testing, and Fixing of Meters, and the general Outdoor Work of a Gas Undertaking. Those having a knowledge of Electricity and laying Electric Mains will have a preference.

Salary, £150 per annum.

Applications, stating age and previous engagements, accompanied by not more than three recent testimonials must be lodged with the Subscriber not later than Monday, the 23rd day of February next.

W. GORDON,
Town Clerk.

Town House, Aberdeen,
Feb. 3, 1891.

WANTED, a Situation by a Gas MANAGER. Has 25 years' practical experience and a thorough knowledge of Carbonizing, Retort-Setting, and Gas-Fittings. Has no objection to going abroad. Excellent references.

Address No. 1907, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by a Competent Gas-Fitter a Situation as SERVICE LAYER, METER FIXER, and INDEX READER. Well up in House fitting, Gas-Stove work, and work in Gas-Works.

Address, FITTER, 206, Millfields Road, CLAPTON, N.E.

MR. ALFRED KITT, Civil Engineer, 5, VICTORIA STREET, WESTMINSTER (for 7 years with The Gaslight and Coke Company, and late Engineer of the Pimlico and Westminster Stations), having retired from the Service, is now prepared to ADVISE GAS COMPANIES on Structural Alterations, Designs for New Works, and assist in Parliamentary Proceedings. Patentee of New Inclined Retorts. Special Oil-Gas Plant.

WANTED, a Situation by the Son of a Gas Manager (aged 21), thoroughly conversant with the general working of Gas-Works, and quite competent to take charge of small Works. First-class references.
Address No. 1902, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, to purchase Gas Carbon delivered at nearest Station to Gas-Works, in quantities of not less than 4 tons.
Address stating price per ton and quantity, No. 1766, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, One or more Second-hand PURIFIERS, not less than 10 ft. by 8 ft., with 6-inch Centre-Valve complete, to work four Purifiers; also a SCRUBBER to pass a maximum make of 60,000 cubic feet per 24 hours.
Address JOS. REEDS, Gas-Works, MATLOCK BATH.

CENTRE-VALVE.

WANTED, a Centre-Valve (for four Purifiers), with 8 or 10 inch Connections.
State price, and if new or second-hand, to the CLERK, Gas Committee, Local Board Offices, SEDGLEY.

ON SALE—Gas Coals and Nuts. Prompt Delivery.
Apply to the MADELEY COAL AND IRON COMPANY, LIMITED, Madeley, NORTH STAFFORDSHIRE.

FOR SALE—Two Purifier "Lifting Travellers" for 12 feet Square Boxes. Equal to new. Messrs. Cockey and Sons makers.
Apply to the GAS-WORKS, JERSEY.

FOR SALE—34 Volumes of the "Journal OF GAS LIGHTING" (23 Bound), from January, 1874, to December, 1890. All in good condition.
Address No. 1900, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.
Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

FOR SALE—A Surveyor's Level (First-Class Maker), nearly new. Cost £14. Price, £9 15s.
Apply, by letter, to No. 1904, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TAR FOR SALE.

THE Falmouth Gas Company have about 18,000 gallons of TAR FOR SALE. Offers invited at per gallon.
Tanks in small Steamers or Sailors preferred. Could load in about Six hours.

THE Hindley Local Board are prepered to receive TENDERS for the supply of FIRE-CLAY RETORTS, FIRE-BRICK, &c.
For particulars, apply to Mr. Dickinson, Gas and Water Manager.
Sealed tenders to be sent to the undersigned not later than Feb. 14, 1891.

By order,
STEPHEN HOLT, Clerk.

Offices: Cross Street, Hindley,
Feb. 5, 1891.

HAWORTH LOCAL BOARD OF HEALTH.

THE above Local Board are prepared to receive TENDERS for the purchase of Surplus TAR and AMMONIACAL LIQUOR, from March 25, 1891, to March 25, 1892, delivered on Rails at Haworth Railway Station.
Tenders, marked "Tar and Liquor Tender," to be sent to me, the undersigned, not later than Feb. 26, 1891.

WM. ROBERTSHAW,
Clerk to the Board.

5, Temple Street, Keighley.

RAMSGATE CORPORATION GAS AND WATER DEPARTMENT.

THE Committee desire Tenders for about 1348 feet of FIRE-CLAY RETORTS, 23 in. by 16 in.; also for about 96,000 FIRE-BRICKS, and 35 tons of CLAY.
Tenders to be sent in, addressed to the Chairman of the Gas and Water Committee, not later than Ten a.m. on Monday, Feb. 16, 1891, endorsed "Tender for Fire-Clay Goods."
The Committee do not bind themselves to accept the lowest or any tender.
Further particulars on application to

WILLIAM A. VALON,
Engineer.

TO GASHOLDER MAKERS.

THE Gas Committee of the Coventry Corporation invite TENDERS for TELESCOPING at the Coventry Gas-Works, a SINGLE-LIFT GASHOLDER, 183 feet diameter, and 34 ft. 6 in. high.
Drawings and specification may be seen at the Offices, Gas-Works, Coventry.
Tenders to be addressed to the undersigned, and delivered not later than the morning of the 18th inst., endorsed "Tender for Gasholder."
The Committee do not bind themselves to accept the lowest or any tender.

GEO. WINSTANLEY, Assoc. M. Inst. C.E.,
Engineer and General Manager.

Feb. 9, 1891.

ASHTON-UNDER-LYNE GAS COMPANY.

GASHOLDER TANK.
TO CONTRACTORS.

THE Directors of the above Company invite TENDERS for the whole of the Work and Material required in the construction of a GASHOLDER TANK, 142 ft. 6 in. diameter and 30 feet deep, in Brickwork, Puddle, &c., at Ashton-under-Lyne.
Drawings and Specifications may be seen, and any further information required can be obtained, on application to the undersigned.
Sealed Tenders, endorsed "Tender for Gasholder Tank," addressed to the Chairman, Gas Company, Ashton-under-Lyne, must be delivered not later than Saturday, the 28th inst.
The Directors do not bind themselves to accept the lowest or any tender.

DAVID CLARKE,
Engineer.

Ashton-under-Lyne,
Feb. 4, 1891.

TO RETORT MANUFACTURERS.

THE Local Board, Atherton, near Manchester, invite TENDERS for RETORTS.
Copies of the specification may be obtained from Mr. Thomas Newbigging, C.E., 5, Norfolk Street, Manchester.
Sealed tenders, endorsed, "Tender for Retorts-Contract No. 6," to be forwarded so as to reach me not later than Twelve noon on Tuesday, the 24th of February prox.
The lowest or any tender not necessarily accepted.

D. SCHOFIELD,
Clerk.

Local Board Offices, Atherton,
Jan. 30, 1891.

STOCKTON-ON-TEES CORPORATION.

THE Gas Committee of the Stockton Corporation invite TENDERS for the construction of a WATER-TIGHT GASHOLDER TANK, 132 feet diameter by 26 ft. 6 in. deep, on the Gas-Works Premises, Stockton-on-Tees.
Plans and specifications may be seen, or any further information may be obtained, on application to Mr. Wm. Ford, at the Gas-Works.
Tenders, sealed, and endorsed "Tender for Gasholder Tank," to be lodged with me on or before Wednesday, the 25th day of February, 1891.
The Gas Committee do not bind themselves to accept the lowest or any tender.

By order,
M. B. DODDS, Town Clerk.

Stockton-on-Tees, Feb. 3, 1891.

CIRENCESTER GAS COMPANY.

TO BUILDERS AND CONTRACTORS.

THE Cirencester Gas Company, Limited, invite TENDERS from experienced Contractors for the erection of a RETORT-HOUSE and COAL-STORE, EXHAUSTER and BOILER-HOUSE, &c., on the Site of their Works, Cirencester.
The drawings and specification may be seen at the Company's Office, and at the Office of Mr. Thos. Newbigging, C.E., 5, Norfolk Street, Manchester, and quantities and form of tender may be obtained from the latter on deposit of Two Guineas, which will be returned on a *bond fide* tender being sent in.
Sealed tenders, endorsed "Retort-House, &c., Contract No. 1," to be addressed to the undersigned, and delivered not later than noon on Wednesday, the 25th inst.
The Directors do not bind themselves to accept the lowest or any tender.

J. P. BEECHAM, Secretary.

Gas Office, Cirencester,
Feb. 3, 1891.

BOROUGH OF RICHMOND, SURREY.

WATER-WORKS AND PUBLIC BATHS.
TENDERS FOR WELSH COAL.

THE Town Council of the Borough of Richmond, Surrey, invite TENDERS for the supply of BEST WELSH SMOKELESS STEAM COAL, in barges of about 40 tons, alongside the Wharf opposite the Water-Works, Richmond, from the 25th of March, 1891, for One year. The Seam and District from which the coal is to be supplied must be stated in the Tender.
Particulars and forms of tender can be obtained of Mr. W. G. Peirce, Engineer at the Water-Works. No tender will be recognized unless it is made on the prescribed form, properly filled up in every respect; and no expenses or claim will be allowed or paid to any person, whether tendering or not.
The security stipulated by the Public Health Act, 1875, for the due performance of the contract will be required. The contract and bond will be prepared by the Town Clerk.
Sealed tenders, endorsed, "Tender for Welsh Coals," and addressed to the Chairman of the Water Supply Committee of the Borough of Richmond, must be delivered at the Town Clerk's Office by Four o'clock on Saturday, the 21st of February, 1891.
The Council do not bind themselves to accept the lowest or any tender.

FRED. B. SENIOR.
Town Clerk.

Town Clerk's Office: 1, Hill Rise,
Richmond, Surrey, Jan. 27, 1891.

YSTRAD GAS AND WATER COMPANY.

TENDERS are required for Setting 43 Retorts—28 in Settings of Seven, and 15 in Settings of Five. Price at per Retort for Labour only (skilled and unskilled).
Address ARTHUR P. JAMES, 134, High Street, MERTHYR TYDFIL.
Feb. 4, 1891.

AMMONIACAL LIQUOR.

THE Gas Committee of the Belfast City Council invite TENDERS for the purchase of the AMMONIACAL LIQUOR made at their Works for a term of Three, Five, or Seven years, commencing on the 1st of July, 1891.
The present annual make of liquor is equal to about 3½ million gallons, as of 4° Twaddel, but the strength at which it is usually supplied is from 5° to 7° Twaddel.
Conditions of contract and other particulars may be obtained from the Manager of the Gas-Works.
Tenders, on Office forms, must be delivered on or before the 25th inst., addressed to the Town Clerk, Town Hall, Belfast, and endorsed "Tender for Ammoniacal Liquor."
The Committee may not accept the highest or any tender.

JAMES STELFOX,
Engineer and Manager.

Belfast Corporation Gas-Works,
Feb. 3, 1891.

TAR.

THE Gas Committee of the Belfast City Council invite TENDERS for the Purchase of the TAR made at their Works, for a Term of Three, Five, or Seven years, commencing on the 1st of July, 1891.
The present annual make of tar is about 1,100,000 gallons.
Conditions of contract and other particulars may be obtained from the Manager of the Gas-Works.
Tenders, on Office forms, must be delivered on or before the 25th inst., addressed to the Town Clerk, Town Hall, Belfast, and endorsed 'Tender for Tar."
The Committee may not accept the highest or any tender.

JAMES STELFOX,
Engineer and Manager.

Belfast Corporation Gas-Works,
Feb. 3, 1891.

THE INCORPORATED GAS INSTITUTE.

NOTICE is hereby given, that the First GENERAL MEETING of The Incorporated Gas Institute, required to be held within four months after Registration by Section 39 of the Companies' Act, 1867, will be held at the Westminster Palace Hotel, Victoria Street, London, S.W., on Friday, the 20th day of February, 1891, at Twelve o'clock noon.
Dated 7th February, 1891.

By order,
W. H. HARVEY,
Secretary.

3, Victoria Street, London, S.W.

RIDDINGS DISTRICT GAS COMPANY.

NOTICE is hereby given, that the ORDINARY HALF-YEARLY MEETING of the Shareholders of the above Company will be held at the Offices of the Company, No. 30, Gracechurch Street, in the City of London, on Tuesday, the 24th day of February, 1891, at Eleven o'clock in the Morning precisely, to receive the Report of the Directors and the Accounts for the Half Year ending the 31st day of December last, to declare a Dividend, to elect Directors and an Auditor in the place of those retiring by rotation, and to transact the General Business of the Company.
The Transfer Books will be closed from the 11th to the 24th inst., both inclusive.

By order of the Board,
ALFRED LASS,
Secretary.

Offices: 30, Gracechurch Street,
London, Feb. 5, 1891.

WANDSWORTH AND PUTNEY GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ORDINARY GENERAL MEETING of the Proprietors of the above Company will be held at the Company's Offices, North Street, Wandsworth, on Thursday, the 26th of February next, at Five o'clock in the Evening precisely, for the purpose of the declaration of a Dividend, the election of Directors and an Auditor, and the transaction of the General Business of the Company.
The Transfer Books will be closed on and from the 18th till the 26th of February, both days inclusive.

By order,
WALTER CROMARTY,
Secretary.

Offices: North Street, Wandsworth,
Jan. 30, 1891.

MITCHAM AND WIMBLEDON DISTRICT GAS-LIGHT COMPANY.

INCORPORATED BY ACT OF PARLIAMENT, 1867.

NOTICE is hereby given, that the FORTY-EIGHTH ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-room at the Works, Mitcham, in the County of Surrey, on Tuesday, the 24th day of February, 1891, at Three o'clock in the afternoon precisely, to receive the Report of the Directors, and a Statement of the Accounts for the Half Year ended the 31st of December, 1890, to declare a Dividend, to Elect Directors and Auditors in place of those retiring by rotation, and for General Business.
The Transfer Books will be closed from the 9th inst. until after the meeting.

By order,
BENJAMIN GREEN,
Secretary and Manager.

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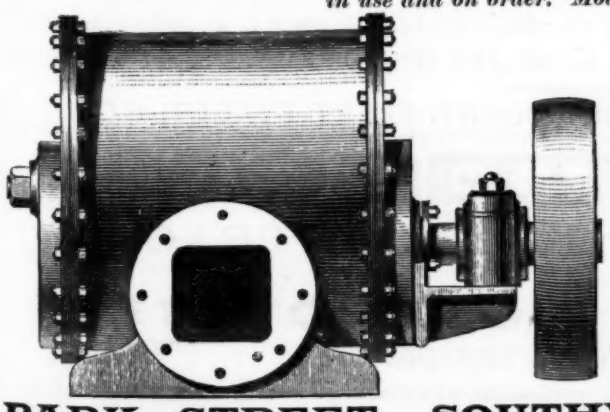

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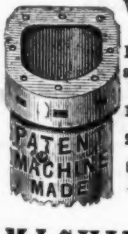

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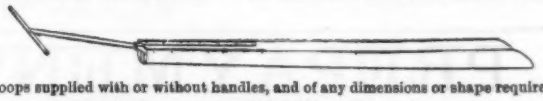

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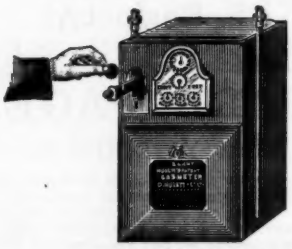

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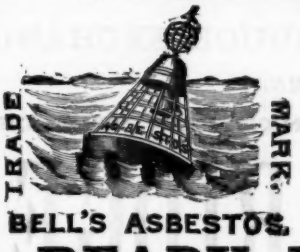

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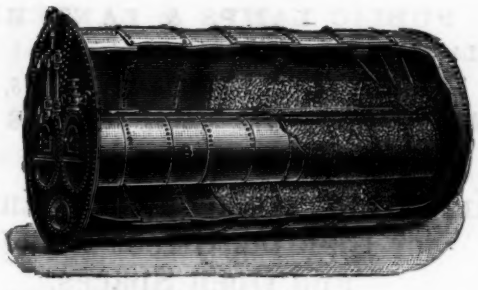
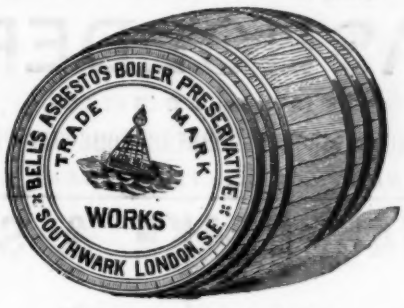


A shows Boiler Plates when incrusted.
B shows Boiler Plates when cleaned by this Composition.



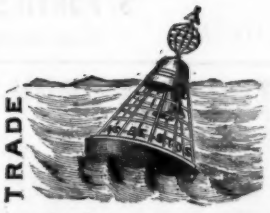
Every Cask is sent out as above.

The action of this **BOILER PRESERVATIVE,** by absorbing the free oxygen that is in the water, **entirely checks pitting and corrosion.** It also disintegrates incrustation so immediately as to prevent its adhering to the plates; and the deposit falls to the bottom in a loose powder, which is easily swept out. By keeping boilers clean, a **great economy of fuel is effected,** and the danger of the plates burning is entirely obviated; thus avoiding the great risks which are inseparable from scaled plates, lengthening the life of a boiler, and **covering its own cost a hundredfold.** Whenever possible it should be used through Feed Pump or Injector, which it will also keep clear from incrustation. The small quantity required to effect its purpose makes this the most economical, and more than repays the higher price we charge for a fluid which, in the case of many other makers, is useless.

QUANTITY REQUIRED. A quarter of a pint weekly per horse power indicated; where the water is very bad rather more, or one pint for every 700 gallons of water evaporated.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
GLASGOW: 35, Robertson Street.
DUBLIN, BERLIN.



DEPÔTS.
BARCELONA, and ANTWERP.

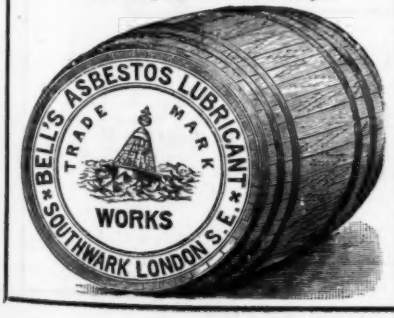
AGENTS.
BIRMINGHAM: BELL and Co., 7, John Bright Street.
BRISTOL: ROBERT STOTESBURY, 114, Redcliff Street.
CARDIFF: BELL and Co., West Bute St.

SOUTHWARK, BELL'S ASBESTOS. LONDON, S.E.

BELL'S ASBESTOS
YARN AND SOAPSTONE PACKING
BEST LOCOMOTIVE PACKING made.

BELL'S
COMPOUND HYDRAULIC PACKING
Is specially suited for
Hydraulic Machinery, Accumulators and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



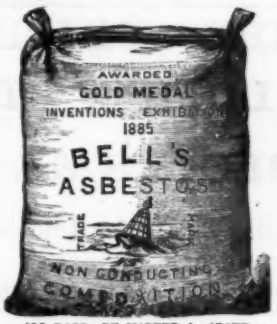
BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.
Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

BELL'S ASBESTOS
EXPANSION SHEETING
RINGS, AND TAPE.
Is the most efficient and reliable Material for Manhole, Mudhole, Steam-Pipe, and all other Joints.

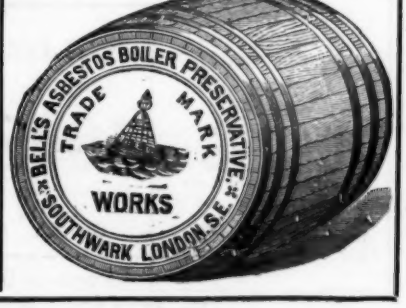
BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.
Will reduce loss by radiation and saves 40 per cent. of fuel.
Is superior to any other, and saves its cost in a few months.



Can be applied again after many years' service. Is sent out dry in bags; therefore cheaper than others sent out wet.

ALL BAGS BE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



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And all classes of GAS PLANT,

REVOLVING BRUSH SCRUBBERS, FOUR-WAY VALVES.

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Specialities in CARBONIZING PLANT.
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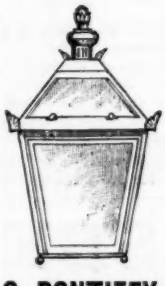
PUBLIC LAMPS & LANTERNS;

GLASS—Flint Opal, and Bent in Stock, and Cut to Sizes.

WELL LAMPS, STREET NAME TABLETS,

LAMP COLUMNS, HEAD IRONS, PUTTYLESS LAMPS,
LANTERN COCKS, REGULATORS,

Improved High-Power Lanterns for Lighting Street Refuges and Open Spaces.



BROWN'S PATENT
LAMPLIGHTERS' TORCHES.

PROPRIETORS AND MANUFACTURERS OF
BOX'S PATENT
PUTTYLESS STREET LAMP.

This Lamp may be supplied fitted with clear opal, or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing Lamps to this system can be supplied at moderate prices.

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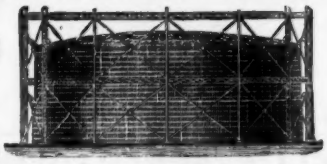
W. C. HOLMES & CO., WHITESTONE IRON-WORKS, HUDDERSFIELD,

Makers of the
PATENT SCRUBBER-WASHER
PATENT EXHAUSTERS,
PATENT ANTI-DIP PIPES,
BROOK'S GAS PRODUCER.



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CONDENSERS, AND VALVES
OF EVERY KIND.

London Office: 80, CANNON STREET, E.C. Illustrated Catalogues on Application.

FIRE BRICKS,
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Special Bricks for Intense Heats.

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EVERY REQUISITE
FOR
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MOBBERLEY & PERRY,

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☞ **Retort Setters sent to any part of the Kingdom.**

JOHN BROTHERTON, LIMITED,

IMPERIAL TUBE WORKS,

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Paris Exhibition 1867.
Amsterdam Exhibition 1883.
Silver Medal and First-Class Certificate
Bronze Medal and Special Diploma
Adelaide Exhibition 1887.
First Order of Merit and Medal.

MANUFACTURERS OF
WELDED IRON TUBES AND FITTINGS
FOR GAS, STEAM, WATER, &c.
LAP-WELDED TUBES
FOR LOCOMOTIVE, MARINE, AND STATIONARY BOILERS, AND OTHER PURPOSES.
HYDRAULIC AND HOT-WATER TUBES.
COILS OF ALL SIZES AND SHAPES.
Stocks, Taps, Dies, Taper Telegraph Poles, &c., &c.

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Silver Medal and First-Class Certificate.

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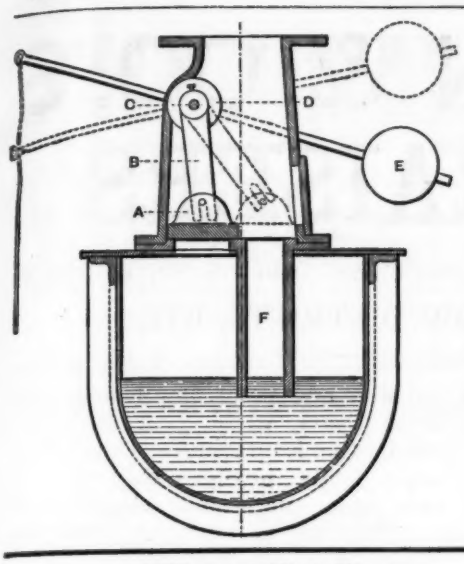
Telegraphic Address: "BROTHERTON, WOLVERHAMPTON."



MEIKLEJOHN'S
PATENT
IMPROVED SLIDE-VALVE ANTI-DIP

Is perfectly reliable in action, and requires no attention.
Has all the advantages of the Dip and Anti-Dip combined.
Is cheap, and easily fixed to any form of main.
Will save more than their cost in one season's working.

MR. THOS. NEWBIGGING'S REPORT.

5, Norfolk Street, Manchester, Dec. 11, 1889.

SIR,—I have examined your Anti-Dip arrangement, and have seen it at work on the Retort-Benches at the Longwood Gas-Works, and the opinion which I have formed of its simplicity and certainty in working is distinctly favourable; so much so *that I consider it to be, without exception, the most efficient Appliance of the kind which has yet been introduced.* It can be applied to existing Benches with great ease, and at a minimum cost. So far as I am aware, it embodies a principle of action not previously applied in this direction.—Yours truly, THOS. NEWBIGGING.

Further particulars from the Sole Patentee and Manufacturer,

NEILL MEIKLEJOHN,
GAS ENGINEER,
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Wrought-Iron

And Fittings and Accessories.

LAMBERT BROS., WALSALL,
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WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM,
BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c.; AND OF
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LONDON: T. LAMBERT & SONS, Short Street, LAMBETH.

Cheapest and Best in the Market.
No. 5 burns 5 to 7 ft. of Gas per hour; and No. 10, 10 to 12 ft.
Priced complete with Governor, Bye-pass Tap, &c.

THE POPULAR.

Iron-decorative Body with Enamelled Tube and Consumer.
No. 5 45s. each,
No. 10 63s. „

The
LAMP MANUFACTURING COMPY., LIMITED.
Sole Licensees of
THE FULLFORD GAS-LAMP
(PATENT).

The flame of the Fullford Lamp when first lighted goes immediately into action without any explosion; and after a few minutes, burns with great steadiness and brilliancy.

AGENTS WANTED EVERYWHERE.
LARGE DISCOUNT. LIBERAL TERMS.

Price List forwarded Free on Application.

PHŒNIX WORKS,
45, CITY ROAD, LONDON, E.C.

THE FRAME.

Electro-bronzed Body and Frame with Painted Enamelled Tube. Very elegant.
No. 5 85s. each.
No. 10 100s. „

Simple, Economical, Reliable,
Easy to light as an ordinary Flat-Flame Gas-Burner.
Save your Gas and your Eyes.

WILLEY & CO.,
GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER.
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GAS APPARATUS,

GASHOLDERS, Telescope and Single-Lift, any size. Some of the largest in the Kingdom erected by this Firm are giving the highest satisfaction.

PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works,** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **Mr. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy of Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

Price Lists, Specifications, and Estimates provided for any work appertaining to Gas Lighting, from the Retort-House to the Drawing-Room.

W. PARKINSON & CO.'S PRESSURE RAISERS

Have been supplied for many years, and are now in successful operation, for the purpose of

INCREASING THE PRESSURE IN LOW DISTRICTS, ETC.

The Machine acts as an exhauster, drawing the Gas from the Main and propelling it according to the pressure required. The result is obtained by a Wet-Meter Drum, which is revolved by Multiplying Wheels and Pullies, actuated by a Weight, as shown in the Engraving. The Pullies may be so arranged as to keep the Apparatus at Work for many hours, provided only there is sufficient depth for the weight to fall. Pressure Raisers have been successfully employed in connection with Apparatus for the Manufacture of Oil Gas, &c. They are also used for supplying a current of Air for various purposes.

Made in Sizes from

5 to 200 LIGHTS.

SEE CATALOGUE.

TESTIMONIALS.

From Peter W. Barlow, Esq., F.R.S., F.G.S.
Engineer to the Tower Subway Co.

56, Landsdowne Road, W.,
Feb. 21, 1883.

Dear Sirs,

The Gas-Pressure Engine in the Tower Subway acts most satisfactorily. It requires very little attention, and is very rarely out of order.

I am, yours truly,
Peter W. Barlow.

Cork Gas Consumers' Company,
Gas-Works, Cork,
20th Feb., 1883.

Gentlemen,

In reply to yours, I beg to say that the Motive-Power Meters with which you have supplied this Company are doing very well. With them we are able to give a good supply to consumers in districts where it would be otherwise difficult to do so.

I am, faithfully yours,
Thomas Travers,
Engineer.

COTTAGE LANE WORKS, CITY ROAD,
LONDON.
Telegraphic Address: "INDEX."

BELL BARN ROAD WORKS,
BIRMINGHAM.
Telegraphic Address: "GAS-METERS."

OFFICE: 10, MAWSON'S CHAMBERS, DEANSGATE,
MANCHESTER.
Telegraphic Address: "PRECISION."
[See also Advt., p. 242.

London: Printed by Walter King (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Feb. 10, 1891.